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NAS WHITING FIELD
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SITE ASSESSMENT REPORT FOR OIL/WATER SEPARATOR AND PRODUCT LINE
INVESTIGATION WITH TRANSMITTAL NAS WHITING FIELD FL
7/1/1998
BROWN & ROOT ENVIRONMENTAL

Rev. 0
7/28/98

Site Assessment Report
for
**Oil/Water Separator and Product
Line Investigation**

at

Naval Air Station Whiting Field
Milton, Florida



Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order 0037

July 1998

**SITE ASSESSMENT REPORT
OIL/WATER SEPARATOR AND PRODUCT LINE INVESTIGATION**

**NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

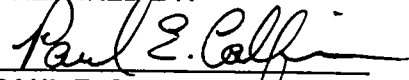
**Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406**

**Submitted by:
Brown & Root Environmental
661 Anderson Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220**

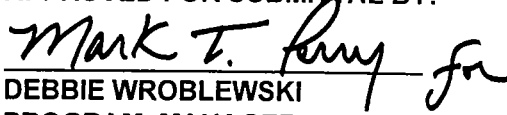
**CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0037**

JULY 1998

PREPARED BY:


**PAUL E. CALLIGAN, P.G.
TASK ORDER MANAGER
FLORIDA LICENSE No. PG-0001864
BROWN & ROOT ENVIRONMENTAL
TALLAHASSEE, FLORIDA**

APPROVED FOR SUBMITTAL BY:


**DEBBIE WROBLEWSKI
PROGRAM MANAGER
BROWN & ROOT ENVIRONMENTAL
PITTSBURGH, PENNSYLVANIA**



Brown & Root Environmental

1311 Executive Center Drive
Ellis Building, Suite 220
Tallahassee, FL 32301-5067
(850) 656-5458
FAX: (850) 656-7403

BRE/TLH-98-047/7648-7.2.3

28 July, 1998

Project Number 7648

Mr. Jim Cason
Remedial Project Manager
Florida Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Reference: Clean Contract No. N62467-94-D0888
Contract Task Order No. 0037

Subject: Site Assessment Report for
Oil/Water Separator and Product Line Investigation
NAS Whiting Field, Milton, Florida

Dear Mr. Cason:

On behalf of the Department of the Navy, Southern Division, Naval Facilities Engineering Command, (SOUTHDIV), Brown & Root Environmental is pleased to submit for your review and approval, two copies of the Site Assessment Report (SAR) for the subject site.

If you have any questions regarding this assessment or require additional information, please contact me at (850) 656-5458.

Sincerely,

Paul E. Calligan, P.G.
Task Order Manager

/pc

Enclosures (2)

c: Mr. Nick Ugolini, SOUTHDIV
Ms. D. Evans-Ripley, SOUTHDIV (w/o enclosure)
Mr. Jim Holland, NAS Whiting Field
Ms. D. Wroblewski (w/o enclosure)
Mr. A. Kendrick

EXECUTIVE SUMMARY

Brown & Root Environmental (B&R Environmental) has completed a Site Assessment (SA) at the above-referenced facility in accordance with the requirements of Chapter 62-770, Florida Administrative Code (FAC). This Site Assessment Report (SAR) has been submitted to the Florida Department of Environmental Protection (FDEP) for approval.

B&R Environmental performed the following tasks during the SA:

- Reviewed available Navy documents to: 1) identify potential sources and receptors for petroleum hydrocarbons in the vicinity; 2) evaluate private potable wells in a 0.25-mile radius and public water supply wells within a 0.50-mile radius; 3) locate nearby surface water bodies; and 4) to determine surface hydrology and drainage;
- Reviewed the Contamination Assessment Report previously prepared for the oil/water separator affiliated with tank system #2993 to determine appropriate boring locations and monitoring well locations;
- Reviewed the Product Line Closure Report prepared for the JP-5 product line affiliated with ASTs #2891 and #2892 to determine appropriate boring locations and monitoring well locations;
- Conducted a direct push investigation which included the installation of 34 soil borings for collecting soil samples for field screening using a Flame Ionization Detector (FID);
- Collected nine soil samples for laboratory analysis of the Kerosene Analytical Group parameters to confirm the field screening results.

Evaluation of soil assessment data indicates that "excessively contaminated soil", as defined by Rule 62-770.200, FAC, is present at the former oil/water separator site and at four locations along the abandoned JP-5 product line.

The areal extent of the "excessively contaminated soil" at the oil/water separator is approximately 120 feet by 28 feet. The "excessively contaminated soil" is primarily found in the vicinity of the former oil/water separator and associated sludge tank and along the drain which carried runoff from the parking lot to the oil/water separator. The "excessively contaminated soil" extends to a maximum depth of 22 feet below land surface in the immediate vicinity of the sludge tank but is limited to the upper 10 to 15 feet elsewhere within the plume.

The presence of "excessively contaminated soil" along the abandoned JP-5 product line is limited to the area of the former dispensing facility southwest for the intersection of Hornet and Enterprise Streets, the

product line junction at the corner of Hornet and Saratoga Streets, and at the product line pumping station near the eastern end of Hornet Street. The aerial extent of "excessively contaminated soil" at the former dispensing facility is approximately 90 feet by 35 feet. The vertical extent of "excessively contaminated soil" extends to a maximum depth of approximately 19 feet in two borings but is limited to the upper 10 feet in the remaining borings. "Excessively contaminated soil" was only detected in one soil boring at the former product line pump station. The maximum depth at which excessively contaminated soil was detected at this location was 13 feet bls.

An extensive area of "excessively contaminated soil" was detected in the area of the product line junction. However, review of the preliminary data collected during this investigation and evaluation of historical data from previous investigations conducted in the vicinity suggests that the product line junction plume is co-mingled with the North Field Industrial Area petroleum plume. Therefore, the product line junction will be addressed as part of the ongoing IR investigation being conducted at the facility. No data from the product line junction is included in this report.

Based on the limited vertical extent of "excessively contaminated soil" (typically < 20 feet bls) and the deep water table (approximately 90 feet bls), a groundwater investigation was not conducted as part of this SA.

Based on the presence of "excessively contaminated soil", B&R Environmental recommends that a Remedial Action Plan (RAP) be developed to evaluate alternatives for remediating the "excessively contaminated soil".

EXECUTIVE SUMMARY

Brown & Root Environmental (B&R Environmental) has completed a Site Assessment (SA) at the above-referenced facility in accordance with the requirements of Chapter 62-770, Florida Administrative Code (FAC). This Site Assessment Report (SAR) has been submitted to the Florida Department of Environmental Protection (FDEP) for approval.

B&R Environmental performed the following tasks during the SA:

- Reviewed available Navy documents to: 1) identify potential sources and receptors for petroleum hydrocarbons in the vicinity; 2) evaluate private potable wells in a 0.25-mile radius and public water supply wells within a 0.50-mile radius; 3) locate nearby surface water bodies; and 4) to determine surface hydrology and drainage;
- Reviewed the Contamination Assessment Report previously prepared for the oil/water separator affiliated with tank system #2993 to determine appropriate boring locations and monitoring well locations;
- Reviewed the Product Line Closure Report prepared for the JP-5 product line affiliated with ASTs #2891 and #2892 to determine appropriate boring locations and monitoring well locations;
- Conducted a direct push investigation which included the installation of 34 soil borings for collecting soil samples for field screening using a Flame Ionization Detector (FID);
- Collected nine soil samples for laboratory analysis of the Kerosene Analytical Group parameters to confirm the field screening results.

Evaluation of soil assessment data indicates that "excessively contaminated soil", as defined by Rule 62-770.200, FAC, is present at the former oil/water separator site and at four locations along the abandoned JP-5 product line.

The areal extent of the "excessively contaminated soil" at the oil/water separator is approximately 120 feet by 28 feet. The "excessively contaminated soil" is primarily found in the vicinity of the former oil/water separator and associated sludge tank and along the drain which carried runoff from the parking lot to the oil/water separator. The "excessively contaminated soil" extends to a maximum depth of 22 feet below land surface in the immediate vicinity of the sludge tank but is limited to the upper 10 to 15 feet elsewhere within the plume.

The presence of "excessively contaminated soil" along the abandoned JP-5 product line is limited to the area of the former dispensing facility southwest for the intersection of Hornet and Enterprise Streets, the

product line junction at the corner of Hornet and Saratoga Streets, and at the product line pumping station near the eastern end of Hornet Street. The aerial extent of "excessively contaminated soil" at the former dispensing facility is approximately 90 feet by 35 feet. The vertical extent of "excessively contaminated soil" extends to a maximum depth of approximately 19 feet in two borings but is limited to the upper 10 feet in the remaining borings. "Excessively contaminated soil" was only detected in one soil boring at the former product line pump station. The maximum depth at which excessively contaminated soil was detected at this location was 13 feet bls.

An extensive area of "excessively contaminated soil" was detected in the area of the product line junction. However, review of the preliminary data collected during this investigation and evaluation of historical data from previous investigations conducted in the vicinity suggests that the product line junction plume is co-mingled with the North Field Industrial Area petroleum plume. Therefore, the product line junction will be addressed as part of the ongoing IR investigation being conducted at the facility. No data from the product line junction is included in this report.

Based on the limited vertical extent of "excessively contaminated soil" (typically < 20 feet bls) and the deep water table (approximately 90 feet bls), a groundwater investigation was not conducted as part of this SA.

Based on the presence of "excessively contaminated soil", an IRA soil excavation will be performed to remove the source. Subsequent to source removal B&R Environmental will submit a SAR Addendum documenting the results of the IRA.

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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

A Site Assessment (SA) was conducted by Brown and Root Environmental (B&R Environmental) for the US Navy (Navy) Southern Division Naval Facilities Engineering Command under Contract Task Order 0037, for the Comprehensive Long-term Environmental Action Navy (CLEAN III), Contract Number N62467-94-D-0888. The SA was conducted at the closed oil/water separator for Tank System 2933A and closed Jet Petroleum No. 5 (JP-5) product line located at the Naval Air Station (NAS) in Milton, Florida. The Florida Department of Environmental Protection (FDEP) Facility Identification Number is 578516386.

The purpose of this SA was to determine the nature and extent of petroleum hydrocarbon impacted soil and groundwater in accordance with the requirements of Chapter 62-770, Florida Administrative Code (FAC). A SAR Summary Sheet, as required by Chapter 62-770, FAC is included in Appendix A.

1.2 SITE DESCRIPTION

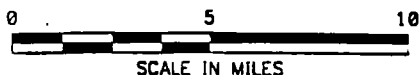
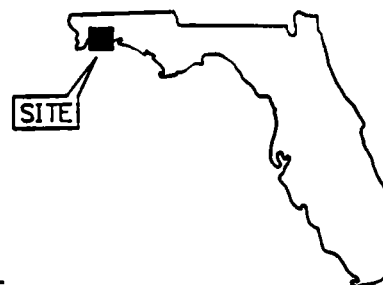
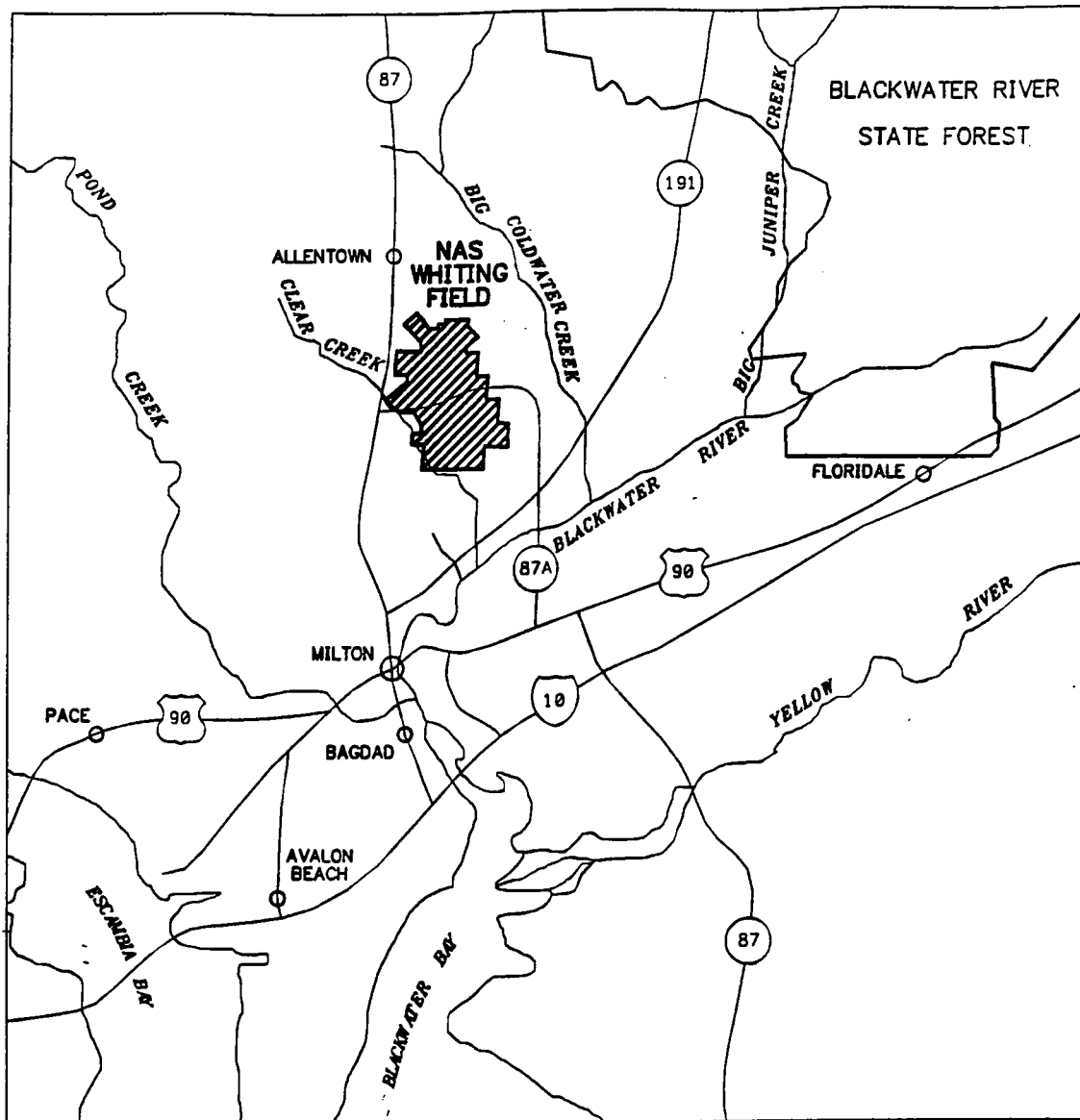
1.2.1 Location

NAS Whiting Field is located in Santa Rosa County, which is in Florida's northwest coastal area, approximately 7 miles north of Milton and 20 miles northeast of Pensacola (Figure 1-1). NAS Whiting Field presently consists of two airfields separated by an industrial area. The installation is approximately 3,490 acres in size. Figure 1-2 presents the installation layout and the location of the sites (closed oil/water separator and closed JP-5 product line). The sites are located in the northeast quarter of Section 2, Township 2 North, Range 28 West. The sites are within the United States Geological Survey (USGS), Milton North Quadrangle, 7.5 Minute Series Topographic Map (1987).

1.2.2 Topography and Drainage

NAS Whiting Field is located within the Western Highlands subdivision of the Northern Highlands physiographic province. This zone is characterized by southward sloping hills and plateaus, which have been cut by numerous streams. Elevations within the subdivision generally range from 50 to 200 feet above National Geodetic Vertical Datum (NGVD). Site elevations range from 150 feet to 190 feet above NGVD. Surface water runoff is conveyed to Clear Creek (west and south) and Big Cold Creek (east) by a

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SOURCE:

ABB ENVIRONMENTAL SERVICES INC. 1992

NOTE:

NAS = NAVAL AIR STATION

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CHECKED BY DATE
PC 5/22/98

COST/SCHED-AREA

SCALE
AS NOTED



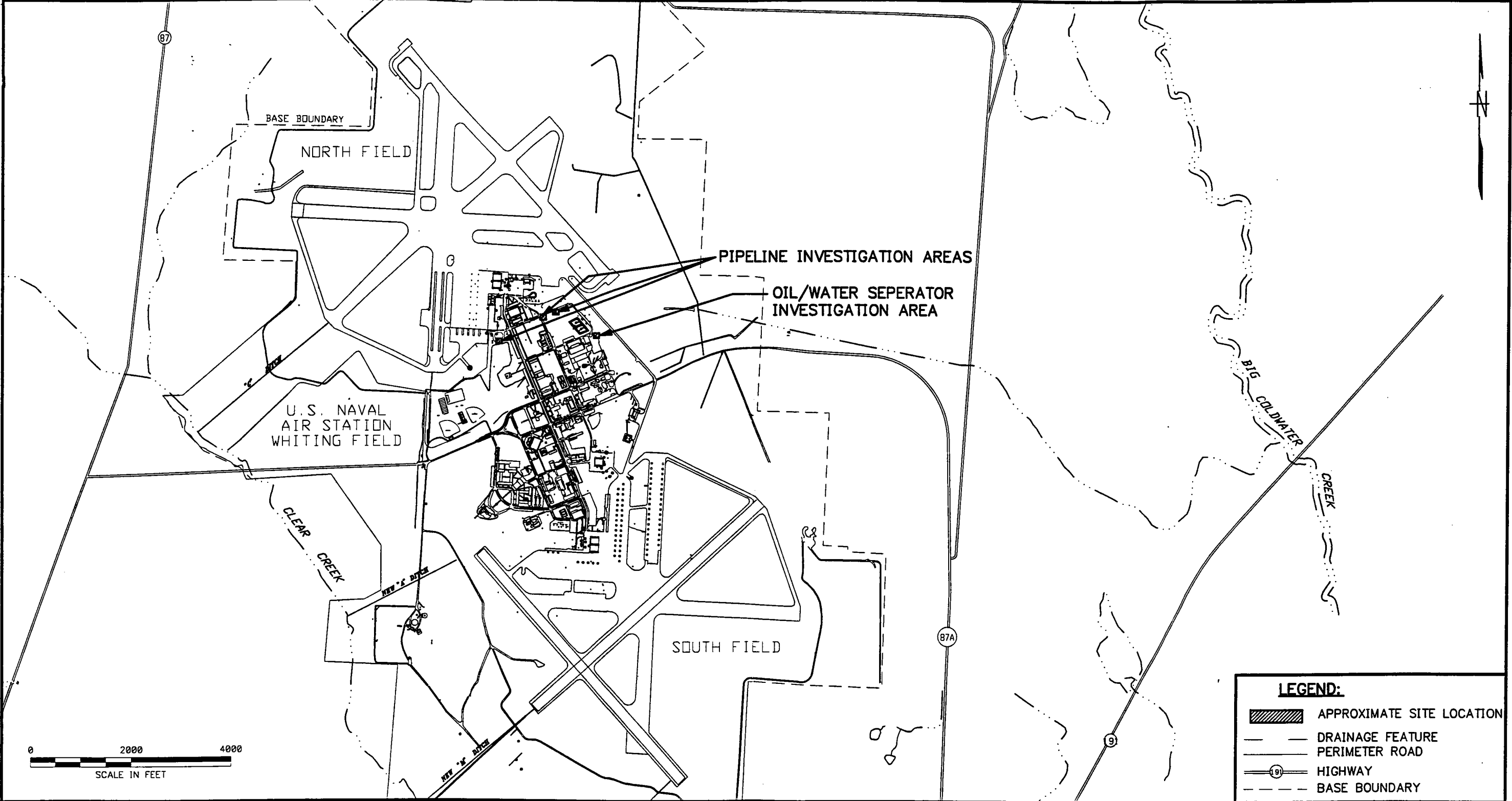
**FACILITY LOCATION MAP
NAS WHITING FIELD
MILTON, FLORIDA**

CONTRACT NO.
7648

APPROVED BY DATE
P. CALLIGAN 5/22/98


APPROVED BY DATE

DRAWING NO. REV.
FIGURE 1-1 0



LEGEND:

- APPROXIMATE SITE LOCATION
- DRAINAGE FEATURE
- PERIMETER ROAD
- HIGHWAY
- BASE BOUNDARY

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY TAD	DATE 9/10/97		SITE LOCATION MAP NAS WHITING FIELD MILTON, FLORIDA	CONTRACT NO. 7648	
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system of ditches and storm drains. The drainage system was installed when the Base was constructed in the early 1940's.

1.2.3 Regional Hydrogeology

NAS Whiting Field is underlain by a thick sequence of tertiary sedimentary formations. Information on the regional hydrogeology presented in this section is summarized from the Remedial Investigation and Feasibility Study, Phase IIA, Technical Memorandum No. 4, Hydrogeologic Assessment, prepared by ABB Environmental Services (ABB, 1995).

Groundwater in Northwest Florida occurs within three major aquifer systems. These aquifer systems include the surficial aquifer system (referred to as the sand-and-gravel aquifer in the western panhandle), the intermediate aquifer system and confining unit, and the Floridan aquifer system.

The sand-and-gravel aquifer is the major water-bearing unit in Santa Rosa County. The aquifer consists of a complex sequence of sand, gravel, silt and clay that is estimated to be approximately 350 feet thick in the vicinity of NAS Whiting Field. The sand-and-gravel aquifer consists of river and marine terrace deposits of the Pleistocene age, overlying the Pliocene Citronelle formation. The Citronelle formation, in turn, overlies a coarse clastic Miocene unit at the base of the aquifer. These units vary in thickness from 100 to 700 feet. They typically thin out to the north and east, gradually pinching out in central Walton County. Although composed predominantly of sand, the aquifer contains numerous lenses of clay and gravel that are as much as 60 feet thick. Virtually all of the groundwater used in Santa Rosa County is pumped from the sand-and-gravel aquifer. The aquifer is recharged entirely by rainfall. Throughout most of the Florida panhandle the bottom of the sand-and-gravel aquifer is typically marked by the intermediate aquifer system.

The intermediate aquifer separates the sand-and-gravel aquifer from the Upper Floridan aquifer. The intermediate aquifer consists of the upper Pensacola Clay and the lower Pensacola Clay, separated by a relatively thin, permeable unit known as the Escambia sand. The Miocene clays, which are mixed with silts and marls, are dense with low hydraulic conductivities and provide an effective confining unit in the southern half of Escambia and Santa Rosa Counties. The confining units range in thickness from about 300 feet within Escambia and Santa Rosa Counties to less than 10 feet to the northeast of these counties. The Escambia sand is less than 75 feet thick in the area. The intermediate aquifer system throughout most of Escambia and Santa Rosa Counties is not a water-bearing unit. The unit principally serves as a confining layer between the sand-and-gravel and the upper Floridan aquifers.

The Floridan aquifer system is present throughout the Florida panhandle. The system is over 1,000 feet thick in the vicinity of NAS Whiting Field. In Santa Rosa and Escambia Counties the system consists of an upper and lower aquifer separated by a confining layer (the Bucatunna Clay of the Byram Formation). The carbonate sequence containing the upper and lower Floridan aquifers dips below the level of the Gulf of Mexico in Escambia County and becomes saline. Additionally, the carbonate rock is highly soluble in the acidic groundwater, which causes the water to be highly mineralized. Consequently, the aquifer system is not commonly used as a source of water in the western part of the Florida panhandle.

1.2.4 Land Use

NAS Whiting Field, home of Training Air Wing Five (TRAWING FIVE), was constructed in the early 1940s. It was commissioned as the Naval Auxiliary Air Station Whiting Field in July 1943 and has served as a naval aviation training facility ever since its commissioning. The field's mission has been to train student naval aviators in the use of basic instruments; formation and tactic phases of fixed-wing, propeller-driven aircraft; and basic and advanced helicopter operation.

1.2.5 Site Description

Oil/Water Separator

Tank system 2993A consisted of an oil/water separator, a 500-gallon underground storage tank (UST) used to store jet fuel, and a sludge tank, as shown on Figure 1-3. The oil/water separator provided secondary containment for overfills occurring at the 500-gallon UST, and also received the rainfall collected in a stormwater collection sump from runoff from a near-by fuel truck parking area.

Tank system 2993A was located approximately 200 feet east of Building 2993 in an earthen grassy area which slopes to the east. To the west of the site is an asphalt covered parking area extending approximately 200 feet west to building 2993, the Fuel Contractor's office. Immediately adjacent to the site, along the edge of the asphalt parking area, is a one story metal building set on a concrete slab. This structure is used as a drive through truck maintenance bay. Approximately 400 feet to the northwest of the site are two 230,000-gallon above ground jet fuel tanks within concrete containment and two small storage buildings. To the north of the site is an earthen grassy area which extends approximately 1,000 feet to the North Field runways. To the east and southeast of the site for over ¼ mile is earthen, grassy vacant land.

Product Pipeline

The product pipeline investigated during this SA includes a portion of the system of pipelines formerly affiliated with two above ground storage tanks (ASTs) identified as Tank #2891 and Tank #2892. The product line was used to transport jet fuel stored in the ASTs to the dispensing facility. The section of the product line included in this investigation begins at the pump station facility located on Hornet Street, and extends in a southwesterly direction, along the south side of Hornet Street, under Saratoga Street to an abandoned dispensing facility located southwest of the junction of Hornet and Enterprise Streets.

The product pipeline section from the pump station to the dispensing facility consists of 10-inch diameter metal pipe and is approximately 1315 feet in length. The product line maintains a consistent below grade depth of approximately 3 feet except for an above ground junction located at the southeast corner of Hornet Street and Saratoga Street and an exposed portion near the pump station facility. The piping section is located within a relatively flat grassy surface area. A site plan depicting the area of the product line investigation is provided on Figure 1-4.

1.2.6 Potable Water Well Survey

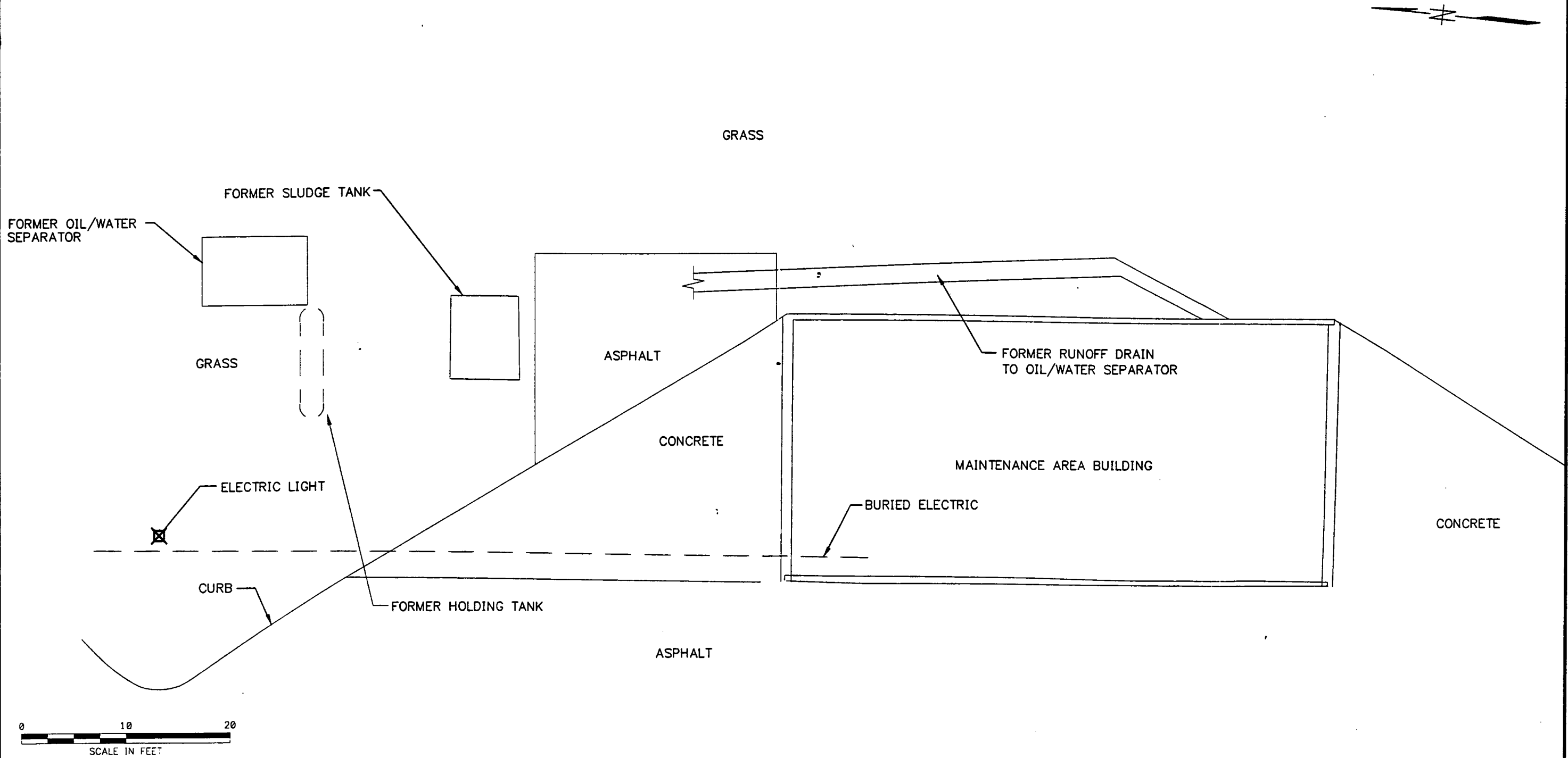
The potable water supply information presented in this report was obtained from the Remedial Investigation and Feasibility Study, General Information Report, prepared by ABB Environmental Services, (ABB, 1997). According to this report, potable water for NAS Whiting Field is currently supplied by three wells: North well, W-N4; South well, W-S2; and West well, W-W3. These three wells are within 0.5 mile radius of the former oil/water separator and the closed product line. Six additional potable water supply wells were located at NAS Whiting Field, however, these wells have been abandoned in place. The locations of the currently used wells are shown on Figure 1-5. The three production wells are all screened in the sand-and-gravel aquifer from approximately 150 to 350 feet below land surface (bls).


1.3 SITE HISTORY AND OPERATIONS

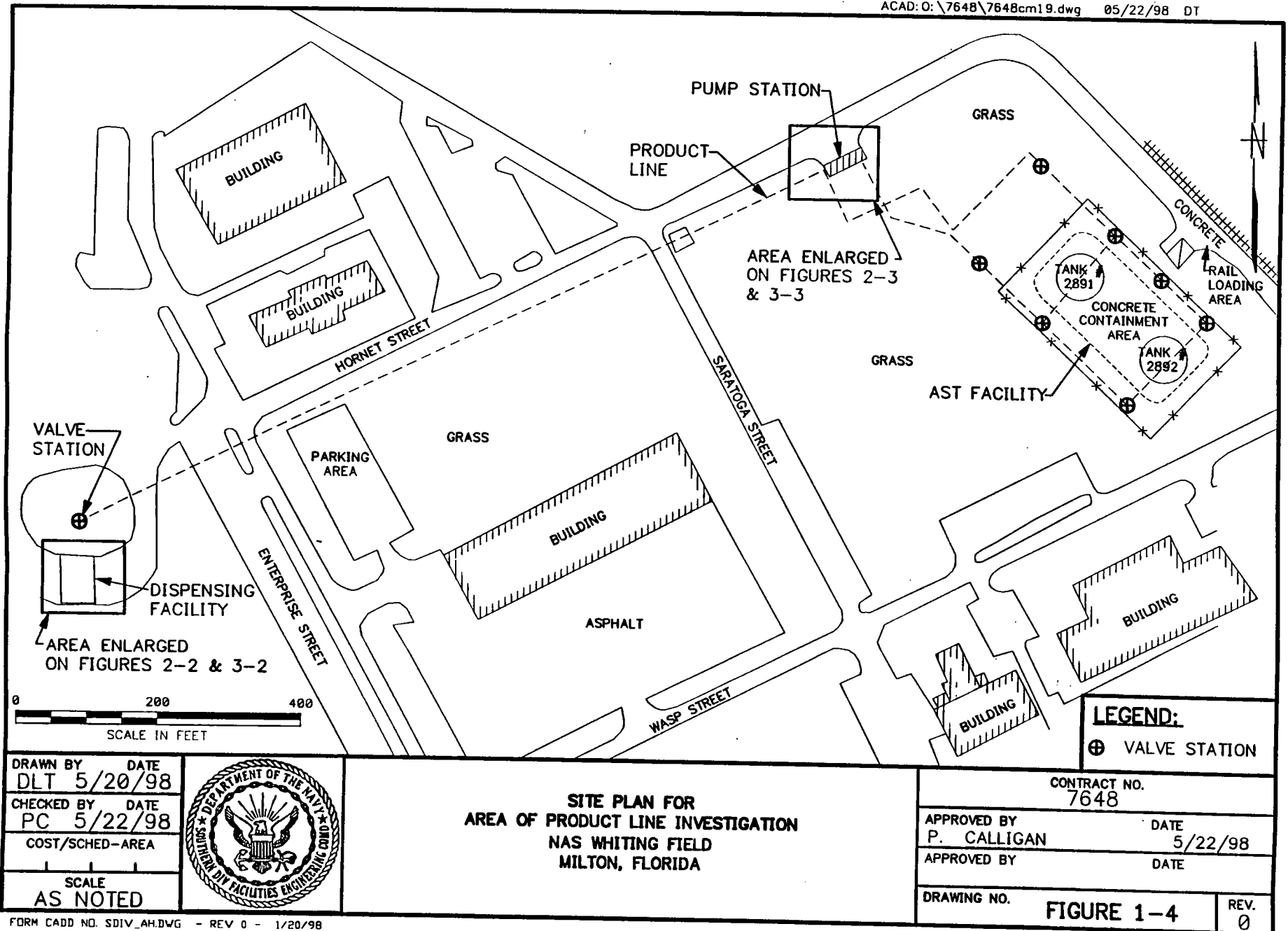
1.3.1 Site History

Oil/Water Separator

Tank system 2993 was put into service in 1981. In September 1994, during an inspection of the oil/water separator system by the FDEP, free product was observed in the northeast compliance well. A Discharge Notification Form (DNF) filed for the release listed the type of substance discharged as jet fuel. Product



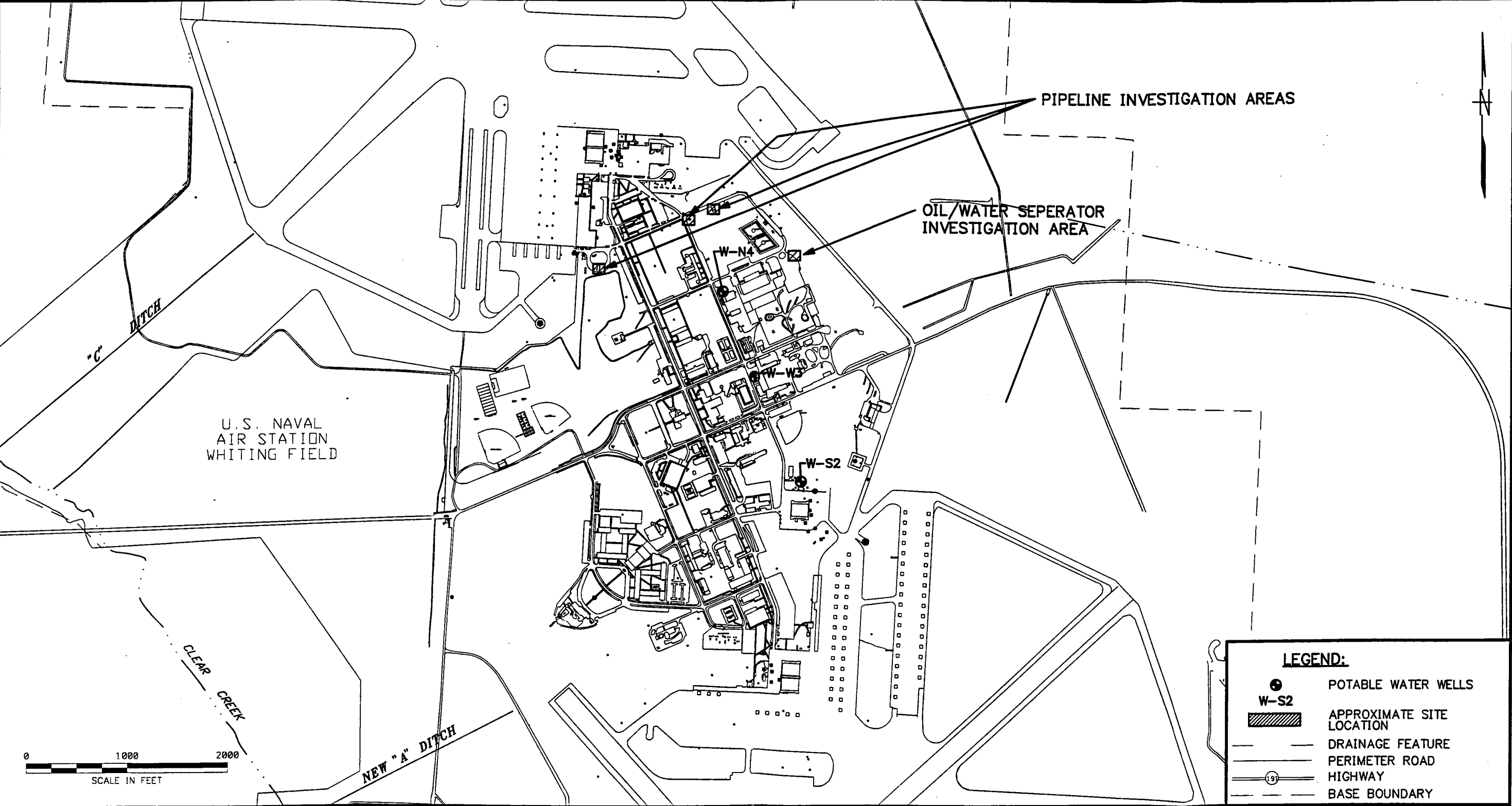
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE		SITE PLAN FOR OIL/WATER SEPARATOR INVESTIGATION NAS WHITING FIELD MILTON, FLORIDA	CONTRACT NO. 7648	
						CHECKED BY <td>DATE<th>APPROVED BY</th><th>DATE</th></td>	DATE <th>APPROVED BY</th> <th>DATE</th>	APPROVED BY			DATE	
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						COST/SCHED-AREA		APPROVED BY			DATE	
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						AS NOTED		FIGURE 1-3	0			

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7/28/98

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1-8

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- LEGEND:**
- POTABLE WATER WELLS
 - W-S2
 - APPROXIMATE SITE LOCATION
 - DRAINAGE FEATURE
 - PERIMETER ROAD
 - HIGHWAY
 - BASE BOUNDARY

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

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PC	5/22/98
COST/SCHED-AREA	
SCALE	
AS NOTED	



LOCATION OF POTABLE WATER SUPPLY WELLS
NAS WHITING FIELD
MILTON, FLORIDA

CONTRACT NO. 7648	
APPROVED BY	DATE
P. CALLIGAN	5/22/98
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was removed from the well and the system was taken out of service. The DNF form filed for the release is included in Appendix B.

In December 1996 the oil/water separator, UST, and sludge tank were removed. At the time the oil/water separator was removed the separator's drain pipe from the UST had been physically isolated from the UST. The Closure Report for the oil/water separator is provided in Appendix C.

Product Line

The JP-5 product line was put into service in 1961. The product line was taken out of service through in-place closure by Environmental Recovery, Inc. (ERI). The closure was conducted from February 26, 1996 through February 29, 1996. A product line closure assessment was performed by Jim Stidham & Associates, Inc. (JSA) from March 26, 1996 through March 29, 1996. The closure report for the product line is provided in Appendix D.

1.3.2 Structural Integrity of Tanks and Lines

According to Base personnel, no tank and line integrity testing was ever performed on tank system 2993 or the JP-5 product line.

1.3.3 Initial Remedial Action

Oil/Water Separator

In December 1996, the oil/water separator, sludge tank and 500 gallon UST associated with tank system 2993 were removed. During removal of the tank system, an Initial Remedial Action (IRA) was conducted to remove "excessively contaminated soil" in the area of the oil/water separator. Approximately 34 cubic yards of soil were removed from an excavation approximately 10 feet by 15 feet by 6 feet in depth. The IRA reporting forms are provided in Appendix C.

Product Line

No IRA activities were performed at the product line.

1.3.4 Previous Investigations

Oil/Water Separator

In May 1995, a CAR investigation was initiated to investigate the areal extent of petroleum hydrocarbons in the groundwater and soil in the vicinity of the oil/water separator system (W. Grady Swan, Inc. Project No. WGS95-0094). A soil vapor assessment was completed by advancing twenty one (21) soil borings (borings 1 to 21) to 5 feet below land surface (bls) and two (2) deep borings (borings 22 and 23) to 31 feet bls and 45 feet bls in the vicinity of the oil/water separator. Soil vapor readings collected from soil samples indicated that "excessively contaminated soil" as defined in Chapter 62-770, FAC for kerosene type fuel releases was present. The "excessively contaminated soil" was identified from the land surface to approximately 5 feet bls within an area radiating outward 10 to 15 feet from the oil/water separator, and to a depth of 20 to 35 feet bls within and immediately adjacent to the oil/water separator. To confirm the vertical extent of petroleum constituents in the soil, (as defined by OVA data), samples were collected from borings 22 and 23 at depths of 29 to 31 feet bls and 45 feet bls, respectively. These samples were analyzed for volatile organic halocarbons, volatile organic aromatics, and polynuclear aromatic hydrocarbons. The results of the soil laboratory analysis reported all parameters below the laboratory method detection limits.

The CAR investigation identified an intermittent perched aquifer at approximately 4 to 10 feet bls beneath the Site. Five monitoring wells were installed by hand auger during the CAR investigation in May 1995 to determine groundwater flow direction, hydraulic gradient, and the horizontal extent of groundwater contamination in the perched aquifer. On June 2, 1995 groundwater samples were collected from monitoring wells MW-1, MW-4, MW-5 and the southwest compliance well for Kerosene Analytical Group parameters. The water quality results indicated the perched aquifer was contaminated with dissolved hydrocarbons above FDEP target levels established in Chapter 62-770, FAC at the "source" location (MW-4).

The CAR investigation concluded that a thin localized perched aquifer underlies the area near the oil/water separator. The perched aquifer is located near the surface and contains groundwater only sporadically, primarily following heavy rainfall. During the initial sampling event all of the monitoring wells with the exception of one, contained less than 1 foot of water. During the second sampling event three of the monitoring wells were dry and the other two contained less than 0.1 foot of water.

The CAR identified the source of contamination to be stormwater discharges from the Fuel Truck Parking Area to the leaking oil/water separator.

Product Pipeline

On March 27, 1996, a Closure Assessment was performed on the product pipeline system once affiliated with two ASTs identified as Tank No. 2891 and Tank No. 2892. The product pipeline system was taken out of service through in-place closure (Jim Stidham & Associates, Inc., April, 1996).

As part of the Closure Assessment, 52 soil borings were advanced to assess soil conditions for the product pipeline system. Of these soil borings, 17 (SB-1 through SB-17) were advanced along the product line extending from the dispensing area to the pump station facility; 20 borings (SB-18 through SB-38) were installed along the product line extending from the pump station to the ASTs; seven borings (SB-39 to SB-45) were advanced adjacent to the rail loading area; five borings (SB-46 through SB-50) were installed around the dispensing area; and two additional borings (SB-51 and SB-52) were installed at the pump station facility. The soil borings were completed at depths of 4 to 7 feet bls except at SB-33, SB-34, and SB-35, where the boring terminated at 12 feet bls, 20 feet bls, and 12 feet bls, respectively. Soil samples from the borings were collected at two foot intervals and screened for hydrocarbon vapors. Results of the soil vapor screening identified "excessively contaminated soil," as defined in Chapter 62-770, FAC for kerosene type fuel release, at boring locations SB-1, SB-12, and SB-17. Borings SB-1, SB-12, and SB-17 are located near the dispensing facility, pipe junction, and pump station facility, respectively. A DNF was filed with the FDEP due to the detection of "excessively contaminated soil". The DNF listed the type of substance discharged as jet fuel with the cause for the leak identified as unknown. The DNF is provided in Appendix B. The Closure Assessment Report is provided in Appendix D.

Based on the results of the product line closure assessment this investigation was limited to the areas of the product line where "excessively contaminated soil" was detected (former dispensing facility, product line junction and pump station facility). Review of the data from the preliminary investigation and evaluation of historical data from previous investigations suggests that the contaminant plume detected at the product line junction is co-mingled with the North Field Industrial Area petroleum plume. Therefore, no further investigation was performed at the product line junction and any additional assessment for that location will be addressed under the IR program. No data from the product line junction is included in this report.

2.0 SUBSURFACE INVESTIGATION METHODS

2.1 QUALITY ASSURANCE

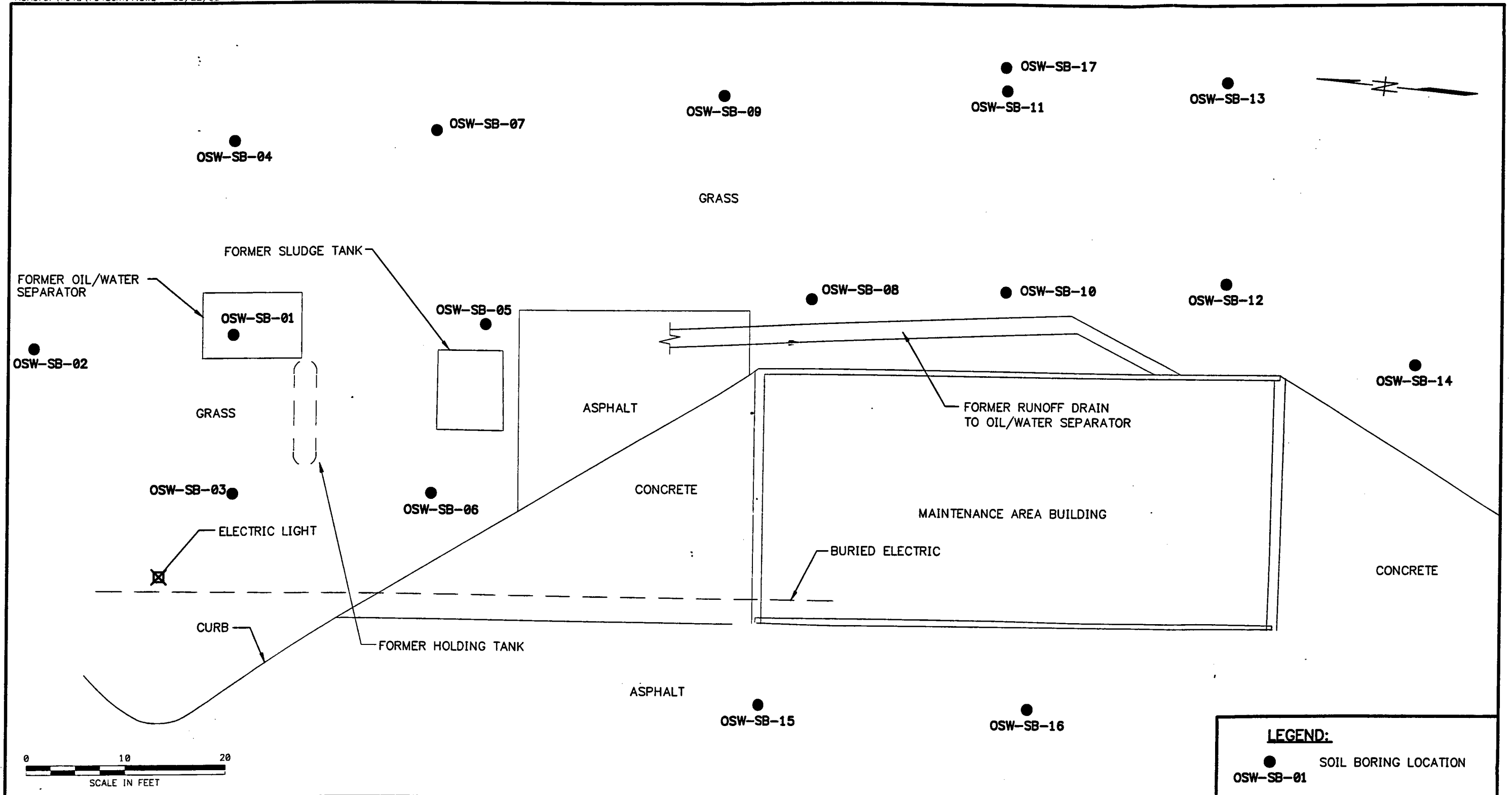
The site investigation was conducted in accordance with the Standard Operating Procedures prescribed by the FDEP Quality Assurance Section Document DER-001/92, and adopted by the B&R Environmental Comprehensive Quality Assurance Plan (CQAP) Number 870055G.

2.2 SOIL BORING PROCEDURES

2.2.1 Direct-Push Soil Borings

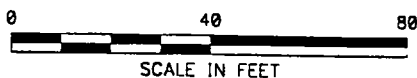
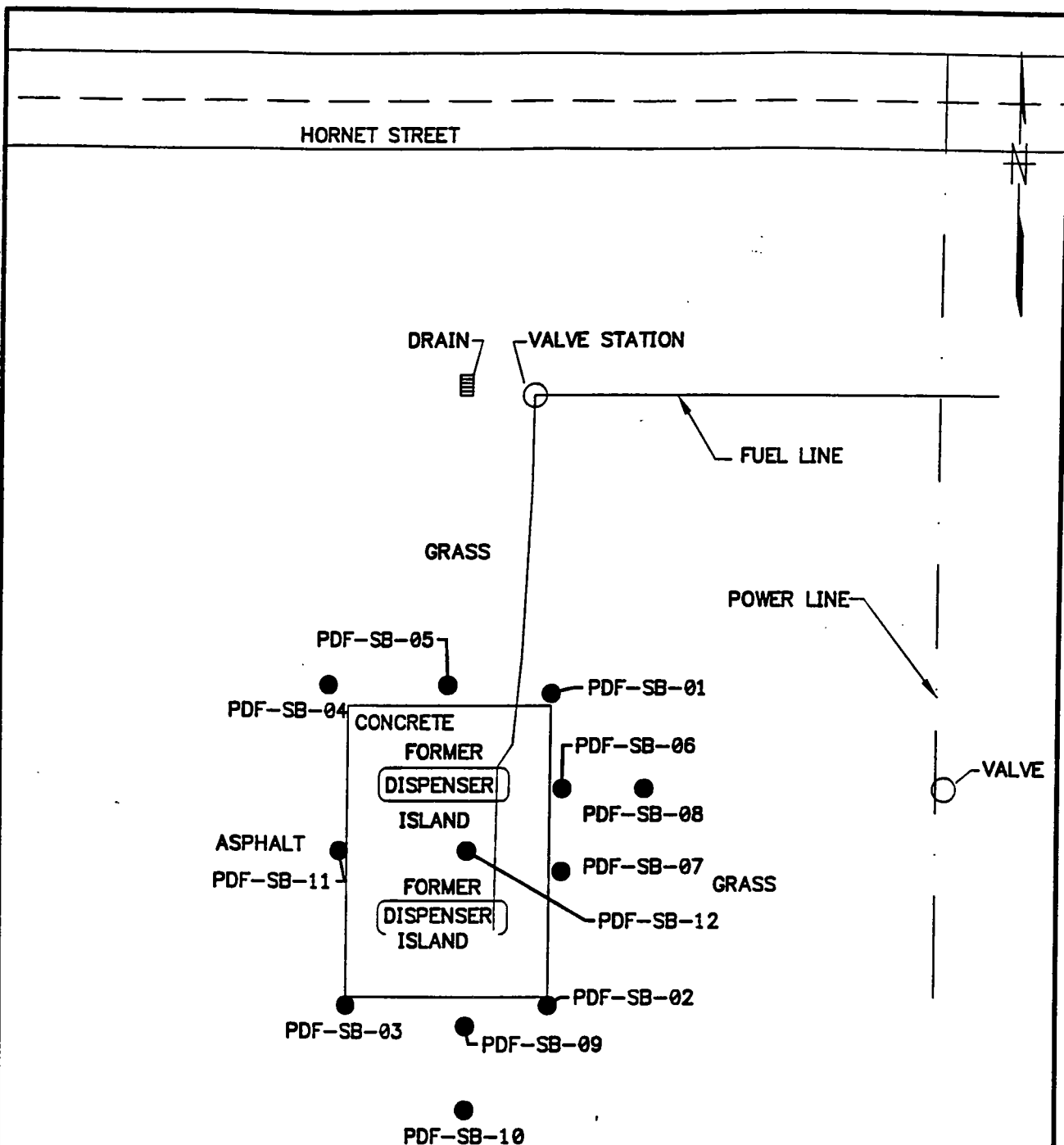
A soil vapor assessment was conducted at the site by B&R Environmental on November 18 through November 23, 1997. Seventeen soil borings were advanced in the vicinity of the oil/water separator (OWS-SB-01 through OWS-SB-17). Twelve soil borings were advanced in the vicinity of the former product line dispensing facility (PDF-SB-01 through PDF-SB-12). Five soil borings were advanced in the vicinity of the product line pump station (PPS-SB-01 through PPS-SB-05). Soil samples were collected from each boring for the purpose of organic vapor screening and for lithologic description. Soil borings were advanced using a truck mounted, direct-push, hydraulic soil probe. Soil samples were collected using two-foot long stainless steel split barrel samplers lined with plastic sleeves. Soil samples were collected continuously from the ground surface to 16 feet bls or until two consecutive samples with headspace results below the 50 parts per million (ppm) threshold for "excessively contaminated soil" were obtained. Soil boring locations and boring completion depths are summarized on Figures 2-1, 2-2 and 2-3; and Tables 2-1, 2-2 and 2-3 respectively. Soil boring logs are provided in Appendix E.

Prior to the advancement of the soil probe at each boring location, the probe was decontaminated according to B&R Environment's CQAP. Soil samples were visually inspected for evidence of oil staining. Soil vapor analysis was conducted on each soil sample collected from the Vadose zone using an Organic Vapor Analyzer-Flame Ionization Detector (OVA-FID). Soil vapor analysis was performed in accordance with the headspace method prescribed by Rule 62-770.200(2) FAC. This method of headspace screening is presented in detail in Appendix F. Headspace concentrations from soil vapor analysis are summarized in Tables 2-1, 2-2 and 2-3.



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE	CONTRACT NO.
							DLT	5/19/98	7648
							CHECKED BY	DATE	APPROVED BY
							PC	5/22/98	P. CALLIGAN
							COST/SCHED-AREA		DATE
							SCALE		DRAWING NO.
							AS NOTED		FIGURE 2-1
									REV.
									0

ACAD: O:\7648\7648CM20.dwg 05/22/98 DT



LEGEND:

● SOIL BORING LOCATION
PDF-SB-01

DRAWN BY DLT	DATE 5/20/98
CHECKED BY PC	DATE 5/22/98
COST/SCHED-AREA	
SCALE AS NOTED	

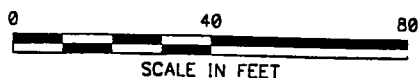
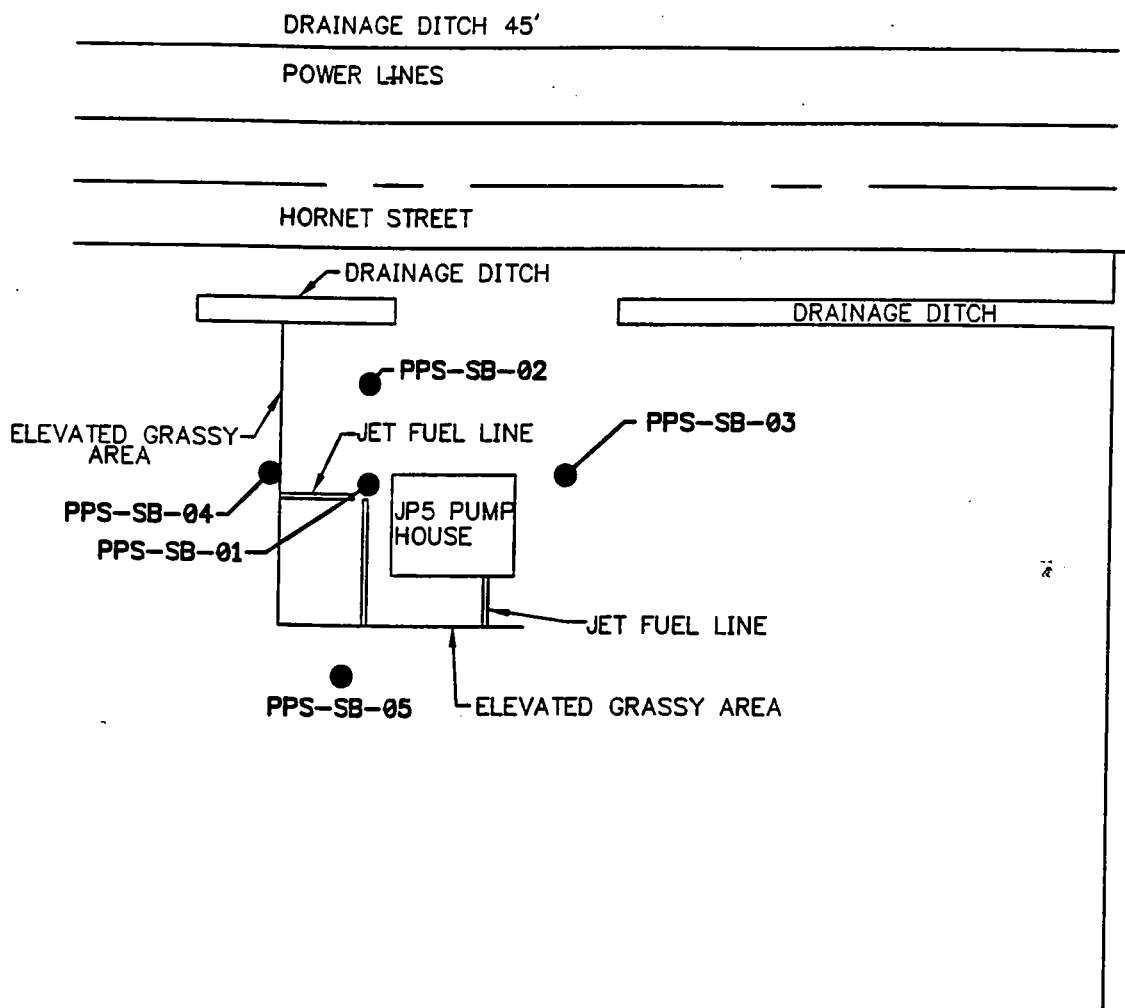


SOIL BORING LOCATION MAP FOR
PRODUCT LINE DISPENSING FACILITY
NAS WHITING FIELD
MILTON, FLORIDA

CONTRACT NO. 7648	
APPROVED BY P. CALLIGAN	DATE 5/22/98
APPROVED BY	DATE
DRAWING NO. FIGURE 2-2	REV. 0

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

ACAD: C:\7648\7648cm22.dwg 05/22/98 DT



LEGEND:
● SOIL BORING LOCATION
PPS-SB-01

DRAWN BY DLT	DATE 5/20/98
CHECKED BY PC	DATE 5/22/98
COST/SCHED-AREA	
SCALE AS NOTED	



SOIL BORING LOCATION MAP FOR
PRODUCT LINE PUMP STATION
NAS WHITING FIELD
MILTON, FLORIDA

CONTRACT NO. 7648	
APPROVED BY P. CALLIGAN	DATE 5/22/98
APPROVED BY	DATE
DRAWING NO. FIGURE 2-3	REV. 0

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

TABLE 2-1
SOIL VAPOR MEASUREMENTS
OIL/WATER SEPARATOR INVESTIGATION
NAS WHITING FIELD
MILTON, FLORIDA
PAGE 1 of 3

Soil Boring No.	Date of Measurement	Sample Interval (feet bls)	Headspace Readings (ppm*)		
			Total Organic Reading	Carbon Filtered Reading	Net Reading
OWS-SB-01	11-18-97	2	ND**	ND	ND
		4	ND	ND	ND
		7	150	50	100
		10	170	30	140
		13	800	20	780
		16	150	ND	150
		19	10	ND	10
		22	ND	ND	ND
OWS-SB-02	11-18-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
OWS-SB-03	11-18-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	20	20	ND
		13	ND	ND	ND
		16	ND	ND	ND
OWS-SB-04	11-18-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
OWS-SB-05	11-18-97	2	ND	ND	ND
		4	5	ND	5
		7	>5000	ND	>5000
		10	1500	ND	1500
		13	250	ND	250
		16	1000	ND	1000
		19	250	50	200
		22	50	10	40
		25	ND	ND	ND

TABLE 2-1

PAGE 2 of 3

Soil Boring No.	Date of Measurement	Sample Interval (feet bls)	Headspace Readings (ppm*)		
			Total Organic Reading	Carbon Filtered Reading	Net Reading
OWS-SB-06	11-18-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
OWS-SB-07	11-18-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
OWS-SB-08	11-19-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	400	ND	400
		13	400	ND	400
		16	100	ND	100
		19	5	ND	5
		22	ND	ND	ND
		25	ND	ND	ND
OWS-SB-09	11-19-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
OWS-SB-10	11-19-97	2	ND	ND	ND
		4	5	ND	5
		7	250	100	150
		10	100	100	ND
		13	200	100	100
		16	200	ND	200
		19	200	ND	200
		22	200	ND	200
		25	5	ND	5
		28	ND	ND	ND
OWS-SB-11	11-19-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND

TABLE 2-1

PAGE 3 of 3

Soil Boring No.	Date of Measurement	Sample Interval (feet bls)	Headspace Readings (ppm*)		
			Total Organic Reading	Carbon Filtered Reading	Net Reading
OWS-SB-12	11-19-97	2	ND	ND	ND
		4	ND	ND	ND
		7	200	50	150
		10	100	50	50
		13	150	100	50
		16	100	ND	100
		19	100	30	70
		22	25	10	15
		25	ND	ND	ND
OWS-SB-13	11-19-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
OWS-SB-14	11-19-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
OWS-SB-15	11-20-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
OWS-SB-16	11-20-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND

* Parts per million

** Non-detected

TABLE 2-2

SOIL VAPOR MEASUREMENTS
PRODUCT LINE DISPENSING FACILITY
NAS WHITING FIELD
MILTON, FLORIDA
PAGE 1 OF 2

Soil Boring No.	Date of Measurement	Sample Interval (feet bls)	Headspace Readings (ppm*)		
			Total Organic Reading	Carbon Filtered Reading	Net Reading
PDF-SB-01	11-20-97	2	ND**	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
PDF-SB-02	11-20-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
PDF-SB-03	11-20-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
PDF-SB-04	11-20-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
PDF-SB-05	11-20-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
PDF-SB-06	11-20-97	2	ND	ND	ND
		4	ND	ND	ND
		7	100	10	90
		10	400	90	310
		13	300	20	280
		16	50	20	30
		19	50	15	35
		22	5	ND	5
		25	ND	ND	ND

TABLE 2-2

PAGE 2 OF 2

Soil Boring No.	Date of Measurement	Sample Interval (feet bls)	Headspace Readings (ppm*)		
			Total Organic Reading	Carbon Filtered Reading	Net Reading
PDF-SB-07	11-21-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
PDF-SB-08	11-21-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
PDF-SB-09	11-21-97	2	ND	ND	ND
		4	ND	ND	ND
		7	>5000	ND	>5000
		10	>5000	50	>5000
		13	200	ND	200
		16	15	ND	15
		19	100	ND	100
		22	30	ND	30
		25	2	ND	2
		27	ND	ND	ND
PDF-SB-10	11-21-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
PDF-SB-11	11-21-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
PDF-SB-12	11-21-97	2	ND	ND	ND
		4	ND	ND	ND
		7	400	45	355
		10	400	20	380
		13	ND	ND	ND
		16	ND	ND	ND

* Parts per million

** Non-detected

TABLE 2-3

**SOIL VAPOR MEASUREMENTS
PRODUCT LINE PUMP STATION
NAS WHITING FIELD
MILTON, FLORIDA**

Soil Boring No.	Date of Measurement	Sample Interval (feet bls)	Headspace Readings (ppm*)		
			Total Organic Reading	Carbon Filtered Reading	Net Reading
PPS-SB-01	11-23-97	2	ND**	ND	ND
		4	2000	ND	2000
		7	100	ND	100
		10	250	ND	250
		13	50	ND	50
		16	10	ND	10
		19	ND	ND	ND
PPS-SB-02	11-23-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
PPS-SB-03	11-23-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
PPS-SB-04	11-23-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
		19	ND	ND	ND
PPS-SB-05	11-23-97	2	ND	ND	ND
		4	ND	ND	ND
		7	ND	ND	ND
		10	ND	ND	ND
		13	ND	ND	ND
		16	ND	ND	ND
		19	ND	ND	ND

* Parts per million

** Non-detected

In accordance with Rule 62-770.600(3), FAC, three samples were collected per site for laboratory analysis to confirm the presence of petroleum-related compounds in the vadose zone soils. The samples were collected from locations exhibiting high, medium and low screening results based on FID headspace analysis.

Decontamination of sampling equipment generated rinse water which was containerized in 55-gallon drums. Soil cuttings generated during the DPT boring installation were placed in a 55-gallon steel drums. A composite soil sample was collected from the drums and analyzed by USEPA Methods SW-846 8010 (volatile organic halocarbons), 8020 (volatile organic aromatics), 8310 (polynuclear aromatic hydrocarbons), total recoverable petroleum hydrocarbons (FLPRO), total halides, and eight RCRA metals. The soil and decontamination fluids will be removed for proper disposal by a Florida-licensed waste hauler. Pre-burn soil laboratory data sheets are included in Appendix G.

2.3 LITHOLOGIC SAMPLING

Representative soil samples were collected during the soil vapor assessment to evaluate the shallow subsurface geologic conditions at the site. Samples used for lithologic description were collected from stainless steel split spoon samplers lined with plastic sleeves. Soil boring logs are included in Appendix E.

2.4 SOIL VAPOR ANALYSIS

Headspace analysis was conducted on soil samples collected during the soil vapor assessment using an OVA-FID. The soil vapor analysis was performed according to the headspace method prescribed in Rule 62-770.200(2), FAC. Screened soil samples with corrected headspace levels in excess of 50 ppm are defined as "excessively contaminated soil" at diesel contaminated sites. The Headspace Methodology for Determining Soil Organic Vapor Concentrations is described in detail in Appendix F.

2.5 SOIL SAMPLING

Soil samples for laboratory analysis were collected at the oil/water separator from soil borings OWS-SB-01, OWS-SB-05, and OWS-SB-09. One laboratory sample was collected at the product line dispensing facility from soil boring PDF-SB-01, and two samples were collected from PDF-SB-06. One laboratory sample was collected at the product line pumping station from PPS-SB-02 and two samples were collected from PPS-SB-02. These samples were analyzed by USEPA

Methods 8020 (volatile organic aromatics), 8310 (polynuclear aromatic hydrocarbons) and total recoverable petroleum hydrocarbon (TRPH) by the FLPRO analytical method.

These samples were collected to confirm the presence of petroleum-related compounds. The laboratory data reports for soil analyses are included in Appendix J.

3.0 RESULTS OF INVESTIGATION

3.1 SITE HYDROGEOLOGY

The type and distribution of sediments encountered at the oil/water separator, the product line dispensing facility and the product line pump station were similar in nature. The sediments from near surface to approximately 3 to 5 feet bls consisted of a fine to medium grained quartz sand, light brown to yellowish in color with some silt. The lower portion of this sand was noted as wet, however, the wet zone was typically less than one foot thick. Based on historical water levels in the monitoring wells previously installed at the oil/water separator, this wet zone is not considered a significant water bearing zone.

Underlying the sand is an alternating sequence of sandy clay, clay and clayey sand, which extends to a depth of approximately 25 feet bls. These sediments have a mottled appearance and range in color from reddish brown to light brown to gray, with a medium stiff density and a slightly plastic consistency. The series is predominantly dry with some zones noted as moist.

Below 25 feet the sediments consisted of very fine to fine grained sand ranging in color from yellowish orange to red. These sediments were noted as dry. Soil boring logs are included as Appendix E.

3.2 SOIL QUALITY

The vertical and horizontal extent of petroleum impacted soil in the vadose zone was assessed through soil vapor analysis performed during the direct-push investigation as described in Section 2.2.1 of this report. To confirm the presence of petroleum related compounds in the vadose zone soil, three soil samples were collected at each site for laboratory analysis as described in Section 2.5 of this report.

3.2.1 Oil Water Separator

During the DPT investigation at the closed oil/water separator, soils exhibiting an OVA response of greater than 50 ppm were encountered in soil borings OSW-SB-01 (780 ppm), OSW-SB-05 (>5000 ppm), OSW-SB-08 (400 ppm), OSW-SB-10 (200 ppm), and OSW-SB-12 (150 ppm). These data indicate that "excessively contaminated soil" is present in the vicinity of these soil borings. The "excessively contaminated soil" extends to a depth of approximately 22 feet in the

immediate vicinity of the former oil/water separator and sludge tank, (OSW-SB-01 and OSW-SB-05); and along the former runoff drain from the parking lot (OSW-SB-10). Elsewhere at the site the "excessively contaminated soil" is limited to the upper 10 to 15 feet of the vadose zone. Soil vapor screening results for the oil/water separator are presented in Table 2-1. Soil vapor concentrations are depicted on Figure 3-1.

The results of the laboratory analysis confirm that petroleum related compounds are present in the vadose zone soil at the site. The highest concentration of petroleum constituents was detected in the soil sample collected from OSW-SB-01. This sample had a TPH concentration of 3800 mg/kg and a naphthalene concentration of 3100 µg/kg. Concentrations above FDEP target levels were also reported for 1-methylnaphthalene and 2-methylnaphthalene. Laboratory analytical results for soil samples collected at the oil/water separator are summarized on Table 3-1.

3.2.2 Product Line Dispensing Facility

During the DPT investigation at the former product line dispensing facility, soils exhibiting an OVA response of greater than 50 ppm were encountered in soil borings PDF-SB-06 (310 ppm), PDF-SB-09 (>5000 ppm) and PDF-SB-12 (380 ppm). These data indicate that "excessively contaminated soil" is present in the vicinity of these soil borings. The "excessively contaminated soil" extends to a depth of approximately 19 feet along the southern and eastern edge of the former dispenser island pad, (PDF-SB-06 and PDF-SB-09). Elsewhere at the site the "excessively contaminated soil" is limited to the upper 10 to 15 feet of the vadose zone. Soil vapor screening results for the product line dispensing facility are presented in Table 2-2. Soil vapor concentrations are depicted on Figure 3-2.

The results of the laboratory analysis confirm that petroleum related compounds are present in the vadose zone soil at the site. The highest concentration of petroleum constituents was detected in the soil sample collected from PDF-SB-06. This sample had a TPH concentration of 20 mg/kg and a total VOA concentration of 6.9 µg/kg. Laboratory analytical results for soil samples collected at the product line dispensing facility are summarized on Table 3-1.

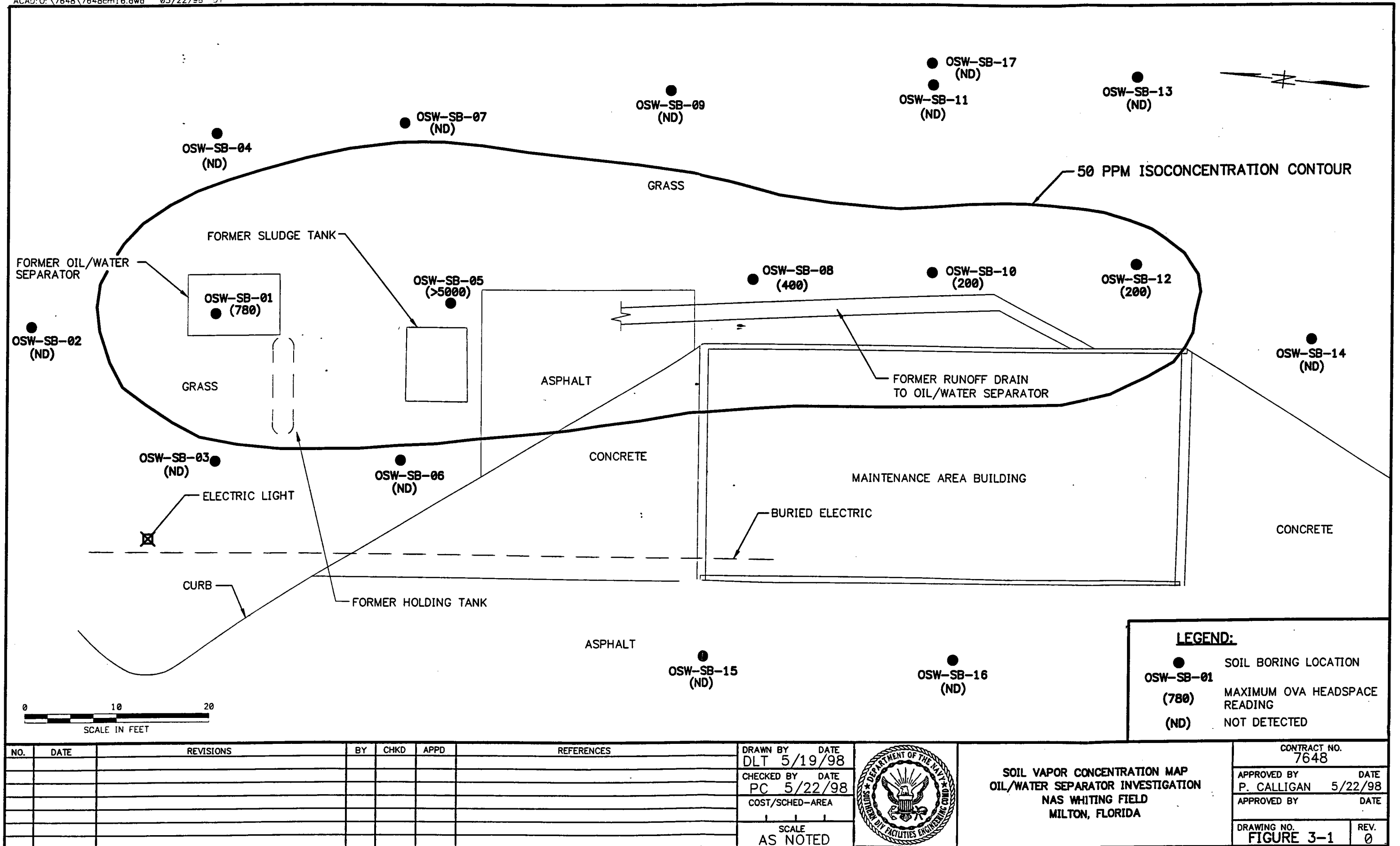


TABLE 3-1
SUMMARY OF SOIL QUALITY:
SELECTED PARAMETERS FROM THE KEROSENE
ANALYTICAL GROUP
Naval Air Station Whiting Field, Milton, Florida
FDEP ID No. 578516386

Sample Location	Date Sampled	Total VOA (mg/kg)	TPH (µg/kg)	Fluor (µg/kg)	Fluor-anth (µg/kg)	Naph (µg/kg)	Benzo(a) anth (µg/kg)	Benzo(a) pyrene (µg/kg)	Benzo(b) fluoran (µg/kg)	Benzo (k) fluor (µg/kg)	Benzo (ghi) (µg/kg)	Indeno (1,2,3-cd) (µg/kg)	Chry-sene (µg/kg)	Pyrene (µg/kg)
OWS-SS-SB05-0506	11/19/97	8.2	540	150	ND	490	ND	ND	ND	ND	ND	ND	ND	ND
OWS-SS-SB05-506D	11/19/97	7.1 ^G	130	ND	ND	30 ^J	ND	ND	ND	ND	ND	ND	ND	ND
OWS-SS-SB01-1112	11/19/97	7.4	3800	430 ^J	ND	3100	ND	ND	ND	ND	ND	ND	ND	ND
OWS-SS-SB09-0506	11/19/97	ND	5.7 ^J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PDF-SS-SB01-0708	11/20/97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PDF-SS-SB06-1819	11/20/97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PDF-SS-SB06-1011	11/20/97	6.9 ^J	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PPS-SS-SB01-0405	11/23/97	195.6 ^G	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PPS-SS-SB01-1011	11/23/97	0.76 ^J	2300	1100	3800	2100	390	360	230	220	120	110	370	1700
PPS-SS-SB02-1011	11/23/97	1.3 ^J	5.6 ^J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Total VOA sum of benzene, toluene, ethylbenzene and xylenes concentrations

TPH total petroleum hydrocarbons

Fluor fluorene

Fluor-anth fluoranthene

Naph naphthalene

Benzo (a) anth benzo(a)anthracene

Benzo (b) fluoran benzo(b)fluoranthene

Benzo (k) fluor benzo(k)fluoranthene

Benzo (g,h,i) benzo(g,h,i)perylene

Indeno (i,2,3-c,d) indeno(1,2,3-cd)pyrene

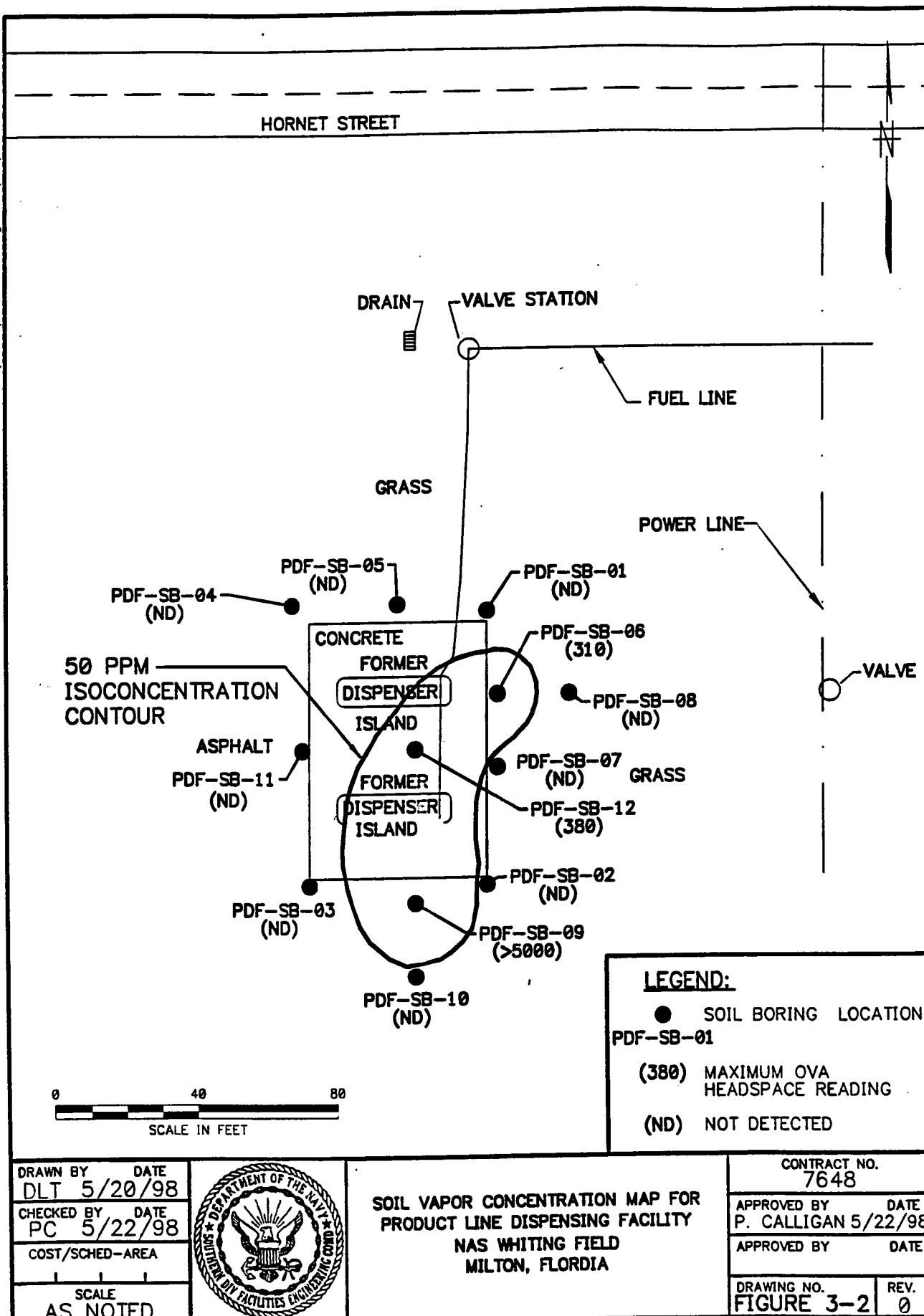
ug/kg concentrations reported in micrograms per kilogram

mg/kg concentrations reported in milligrams per kilogram

J estimated result

G elevated reporting limit due to matrix interference

ACAD: O:\7648\7648cm21.dwg 05/22/98 DT



3.2.3 Product Line Pump Station

During the DPT investigation at the product line pump station, soils with an OVA response of greater than 50 ppm were encountered in soil boring PPS-SB-01 (2000 ppm). This data indicates that "excessively contaminated soil" is present in the vicinity of this soil boring. The "excessively contaminated soil" extends to a depth of approximately 13 feet in the immediate vicinity of boring PPS-SB-01. No other "excessively contaminated soil" was detected in the area of the pump station. Soil vapor screening results for the product line pump station are presented in Table 2-3. Soil vapor concentrations are depicted on Figure 3-3.

The results of the laboratory analysis confirm that petroleum related compounds are present in the vadose zone soil at the site. The highest concentrations of petroleum constituents were detected in the soil sample collected from PPS-SB-01. This sample had a TPH concentration of 2300 mg/kg and a naphthalene concentration of 2100 µg/kg. Concentrations above FDEP target levels were also reported for 1-methylnaphthalene and 2-methylnaphthalene. Laboratory analytical results for soil samples collected at the product line pump station are summarized on Table 3-1.

3.3 ESTIMATED MASS OF CONTAMINANTS IN SOIL

Net soil vapor readings in excess of 50 parts per million (ppm) were used to define "excessively contaminated soil" in accordance with Rule 62-770.200(2), FAC. For the oil/water separator and the product line dispensing facility the area of impacted soil was calculated by assuming a representative geometric shape (an ellipse), then calculating the area based on the equation:

$$\text{Area} = \pi(rA)(rB)$$

where:

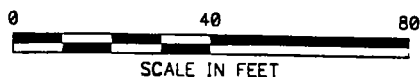
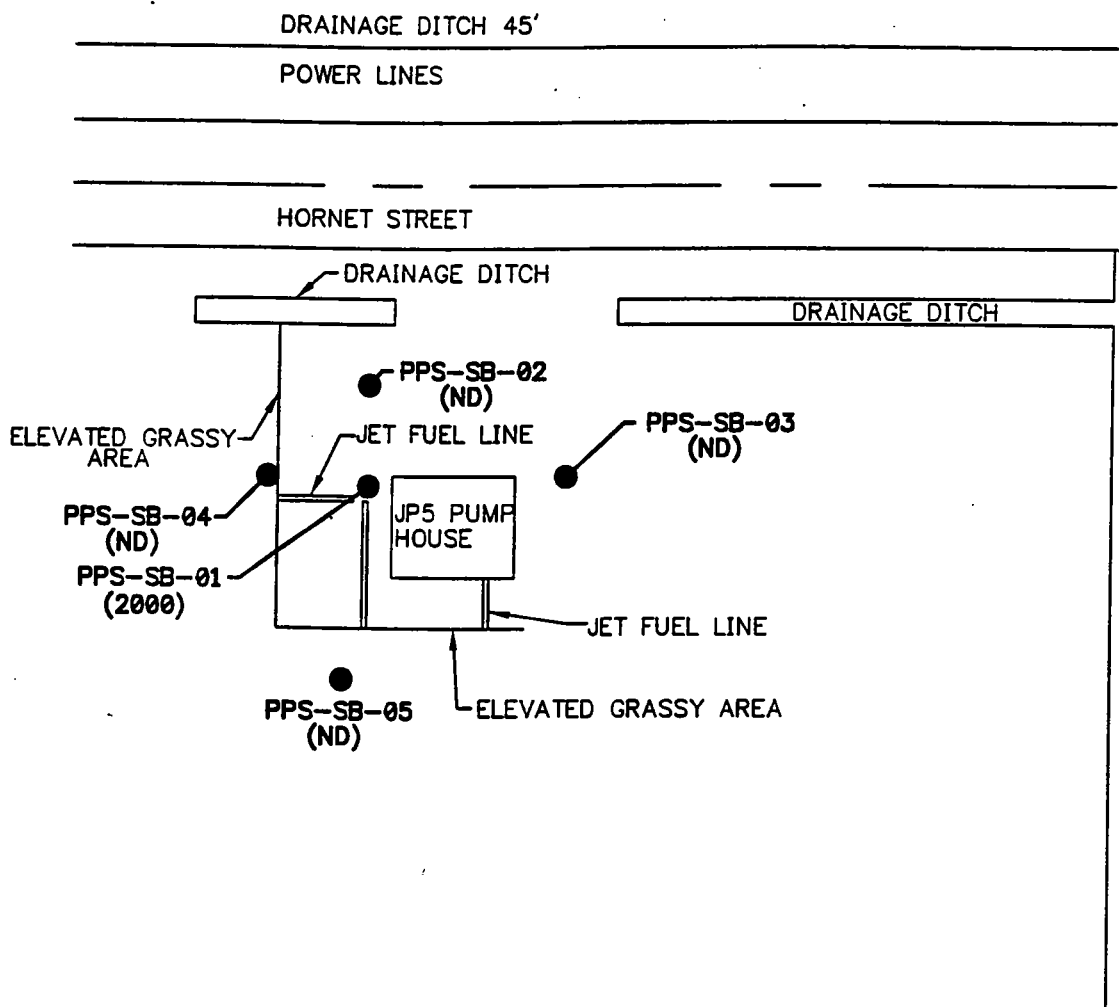
r = the radius of the axis

A = the long axis of the ellipse

B = the short axis of the ellipse

For the product line pump station the area of impacted soil was calculated by assuming the representative geometric shape is a circle and using the formula for the area of a circle.

ACAD: O:\7648\7648cm23.dwg 05/22/98 DT



LEGEND:

- SOIL BORING LOCATION
PPS-SB-01
- (2000) MAXIMUM OVA
HEADSPACE READING
- (ND) NOT DETECTED

DRAWN BY	DATE
DLT	5/20/98
CHECKED BY	DATE
PC	5/22/98
COST/SCHED-AREA	
SCALE AS NOTED	



**SOIL VAPOR CONCENTRATION MAP FOR
PRODUCT LINE PUMP STATION
NAS WHITING FIELD
MILTON, FLORIDA**

CONTRACT NO. 7648	
APPROVED BY	DATE
P. CALLIGAN	5/22/98
APPROVED BY	DATE
DRAWING NO. FIGURE 3-3	REV. 0

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

The volume of the soil was calculated using the equation:

$$\text{Volume} = (\text{Area})(\text{Depth})$$

where:

Area = calculated area in square feet

Depth = average vertical extent of contaminated soil in feet

The mass of contaminants in vadose zone soil was calculated using the following equation:

$$\text{Mass} = \text{Volume ft}^3 \times \frac{1 \text{ yd}^3}{27 \text{ ft}^3} \times \frac{1.4 \text{ tons}}{1 \text{ yd}^3} \times 1016 \frac{\text{kg}}{\text{ton}} \times \frac{\text{mg}}{\text{kg}} \text{TRPH} \times (1.0 \times 10^{-6}) \frac{\text{kg}}{\text{mg}} \times 2.204623 \frac{\text{lb}}{\text{kg}}$$

where:

TRPH = arithmetic mean of Total Recoverable Petroleum Hydrocarbon concentrations.

The estimated mass of contaminants for each site is:

Oil/Water Separator:	7,106 pounds
Product Line Dispensing Area:	9 pounds
Product Line Pump Station:	147 pounds

Soil volume and contaminant mass calculations for each site are provided in Appendix I. The estimated mass does not include contamination dissolved in soil pore water.

4.0 DISCUSSION

"Excessively contaminated" soil, as defined by Chapter 62-770.200 FAC, was detected within the vadose zone at all three sites investigated during this SA. The "excessively contaminated soil" was identified at depths of 7 to 22 feet bls in the area of the closed oil/water separator; 7 to 19 feet bls in the area of the former product line dispensing area; and 4 to 13 feet bls in the area of the product line pump station. These soils exhibited headspace readings of greater than 50 ppm. The presence of petroleum related compounds in the vadose zone was confirmed by laboratory analysis.

Reports from numerous investigations previously conducted at NAS Whiting Field (ABB Environmental Services, 1995, 1995, 1996, 1997), indicate that the water table typically occurs at a depth of approximately 90 feet bls. Based on the limited vertical extent of "excessively contaminated soil" (typically < 20 feet bls), the low permeability of the surficial sediments encountered during this investigation, and the deep water table, a groundwater investigation was not conducted as part of this SA. No free product was encountered during the SA.

5.0 CONCLUSIONS AND RECOMMENDATION

The results of the SA at the closed oil/water separator and the closed JP-5 product line suggest the following:

- The sources of the petroleum contamination are suspected to be the closed oil/water separator and sludge tank affiliated with former tank system #2993A; and the closed JP-5 product line associated with ASTs #2891 and 2892.
- No tank and line tightness testing has ever been performed on the tanks and lines associated with the oil/water separator or the JP-5 product line.
- Three public potable water supply wells were identified within a 0.5 mile radius of the site;
- The surficial aquifer qualifies as a G-II aquifer.
- A combined total of approximately 97,000 cubic feet of "excessively contaminated soil" has been identified at the three sites.
- "Excessively contaminated" soil was encountered at all three sites included in this investigation.
- The vertical extent of the "excessively contaminated soil" is typically limited to the upper 20 feet of the vadose zone.
- No significant water bearing zones were encountered during the course of this investigation.
- No free product was detected at the site during the course of this investigation.

Based on the presence of "excessively contaminated soil", an IRA soil excavation will be performed to remove the source. Subsequent to source removal B&R Environmental will submit a SAR Addendum documenting the results of the IRA.

6.0 REFERENCES

U.S. Geological Survey, North Milton, FLA, Quadrangle, 1987, 7.5 Minute Series Topographic Map, scale 1:24,000.

ABB Environmental Services, Inc., 1995, Remedial Investigation and Feasibility Study, Phase IIA Technical Memorandum No. 4, Hydrogeologic Assessment, Naval Air Station Whiting Field, Milton, Florida.

ABB Environmental Services, Inc., 1997, Remedial Investigation and Feasibility Study, General Information Report, Naval Air Station Whiting Field, Milton, Florida.

W. Grady Swan, Inc., 1995, Contamination Assessment Report for N.A.S. Whiting Field, Site 2993A, Milton, Florida.

Jim Stidham & Associates, Inc., 1996, Product Line Closure Assessment Report, United States Naval Air Station Whiting Field, Milton, Florida.

APPENDIX A

SAR SUMMARY SHEET

SITE ASSESSMENT REPORT SUMMARY SHEET

Facility Name: NAS Whiting Field, Oil/Water Separator, JP-5 Pipeline Reimbursement Site: ☐

Location: Milton, Florida State Contract Site: ☐

EDI #: _____ FAC I.D.# 578516386 Other: Non-Prog. ☒

Date Reviewed: _____ Local Government: _____

(1) Source of Spill: Unknown Date of Spill: 21 Sep 94

(2) Type of Product: Gasoline Group Gallons Lost Kerosene Group Gallons Lost

<input type="checkbox"/> <u>Leaded</u> <input type="checkbox"/> <u>Unleaded Regular</u> <input type="checkbox"/> <u>Unleaded Premium</u> <input type="checkbox"/> <u>Gasohol</u> <input type="checkbox"/> <u>Undetermined</u>	<input type="checkbox"/> <u>Kerosene</u> <input type="checkbox"/> <u>Diesel</u> <input type="checkbox"/> <u>JP-4 Jet Fuel</u> <input checked="" type="checkbox"/> <u>Jet A Fuel</u> <u>Unknown</u> <input type="checkbox"/> <u>Unknown</u>
---	--

(3) Description of IRA: IRA soil excavation performed during removal of oil/water separator, sludge tankd and UST associated with tank system 2993.

<input type="checkbox"/> Free product Removal: _____ (gals) <input checked="" type="checkbox"/> Soil Removal: <u>34.45</u> (cubic yds)	<input type="checkbox"/> Soil Incineration: _____ (cubic yds)
---	---

(4) Free Product still present (yes/no) No Maximum apparent product thickness: N/A (feet)

(5) Maximum Groundwater contamination levels (ppb):

Total VOA: <u>N/A</u>	benzene: <u>N/A</u>	EDB: <u>N/A</u>
lead: <u>N/A</u>	MTBE: <u>N/A</u>	other: <u>N/A</u>

(6) Brief lithologic description: Light brown to yellowish, fine to med. grained sand w/ some silt from surface to ~ 3 to 5 ft.

bls. Alternating sandy clay, clay and clayey sand from ~ 5 to 25 ft. bls. (maximum depth drilled during this investigation).

(7) Areal and vertical extent of soils contamination defined (yes/no) yes

Highest current soil concentration (OVA: >5000 ppm) or (EPA method 5030/8020: 195.6 ppb)

(8) Lower aquifer contaminated? (yes/no) - Depth of vertical contamination: No vertical extent well installed

(9) Date of last complete round of groundwater sampling: N/A Date of last soil sampling: 19 Nov 97

(10) QAPP approved? (yes/no) Date: 6/16/97

(11) Direction (e.g. NNW) of surficial groundwater flow: N/A (Figure _____ on page _____)

(12) Average depth to groundwater: 90 (ft)

(13) Observed range of seasonal groundwater fluctuations: N/A (ft) (Based on water level data collected during the CAR investigation)

(14) Estimated rate of groundwater flow: N/A (ft/day)

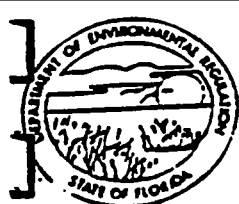
(15) Hydraulic gradient across site: N/A (ft/ft)

(16) Aquifer characteristics:	Values	Units	Method
Hydraulic conductivity	<u>N/A</u>	<u>ft/day</u>	_____
Storage coefficient	<u>N/A</u>	<u>ft/ft</u>	_____
Aquifer thickness	<u>N/A</u>	<u>ft</u>	_____
Effective soil porosity	<u>N/A</u>	<u>%</u>	_____
Transmissivity	<u>N/A</u>	<u>gal/day/ft</u>	_____

(17) Other remarks: No groundwater investigation was performed because excessively contaminated soil is limited to the upper 20 feet of vadose zone and depth to groundwater is approximately 90 feet bls.

APPENDIX B

DISCHARGE NOTIFICATION FORMS



Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

DER Form #	17-761.900(1)
Form Title	Discharge Reporting Form
Effective Date	December 10, 1990
DER Application No.	_____
_____	_____

Discharge Reporting Form

Use this form to notify the Department of Environmental Regulation of.

1. Results of tank tightness testing that exceed allowable tolerances within ten days of receipt of test result.
2. Petroleum discharges exceeding 25 gallons on pervious surfaces as described in Section 17-761.460 F.A.C. within one working day of discovery
3. Hazardous substance (CERCLA regulated), discharges exceeding applicable reportable quantities established in 17-761.460(2) F.A.C., within one working day of the discovery.
4. Within one working day of discovery of suspected releases confirmed by: (a) released regulated substances or pollutants discovered in the surrounding area, (b) unusual and unexplained storage system operating conditions, (c) monitoring results from a leak detection method or from a tank closure assessment that indicate a release may have occurred, or (d) manual tank gauging results for tanks of 550 gallons or less, exceeding ten gallons per weekly test or five gallons averaged over four consecutive weekly tests.

Mail to the DER District Office in your area listed on the reverse side of this form

PLEASE PRINT OR TYPE
Complete all applicable blanks

1. DER Facility ID Number: 578516386 2. Tank Number: 2993A 3. Date: 9-21-94
4. Facility Name: NAS WHITING FIELD
Facility Owner or Operator: PUBLIC WORKS OFFICER
Facility Address: 7151 USS WASP STREET MILTON, FL 32570-68
Telephone Number: (904) 623-7268 County: SANTA ROSA
Mailing Address: SAME
5. Date of receipt of test results or discovery: 9-21-94 month/day/year
6. Method of initial discovery. (circle one only)
A. Liquid detector (automatic or manual) D. Emptying and Inspection. F. Vapor or visible signs of a discharge in the vicinity.
B. Vapor detector (automatic or manual) E. Inventory control. G. Closure: _____ (explain)
C. Tightness test (underground tanks only). H. Other: PRODUCT IN MONITOR WELL
(PRODUCT WAS REMOVED FROM TANK TAKEN OUT OF SERVICE)
7. Estimated number of gallons discharged: UNKNOWN
8. What part of storage system has leaked? (circle all that apply) A. Dispenser B. Pipe C. Fitting D. Tank E. Unknown
9. Type of regulated substance discharged. (circle one)
A. leaded gasoline D. vehicular diesel L. used/waste oil V. hazardous substance includes pesticides, ammonia, chlorine and derivatives (write in name or Chemical Abstract Service CAS number) _____
B. unleaded gasoline F. aviation gas M. diesel Z. other (write in name) _____
C. gasohol G. jet fuel O. new/lube oil
10. Cause of leak. (circle all that apply)
A. Unknown C. Loose connection E. Puncture G. Spill I. Other (specify) _____
B. Split D. Corrosion F. Installation failure H. Overfill
11. Type of financial responsibility. (circle one)
A. Third party insurance provided by the state insurance contractor C. Not applicable
B. Self-insurance pursuant to Chapter 17-769.500 F.A.C. D. None

To the best of my knowledge and belief all information submitted on this form is true, accurate, and complete.



Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Discharge Reporting Form

DER Form #	17-761.900(1)
Form Title	Discharge Reporting Form
Effective Date	December 10, 1990
DER Application File	(Filed in by DER)

Use this form to notify the Department of Environmental Regulation of:

- Results of tank tightness testing that exceed allowable tolerances within ten days of receipt of test result.
- Petroleum discharges exceeding 25 gallons on pervious surfaces as described in Section 17-761.460 F.A.C. within one working day of discovery.
- Hazardous substance (CERCLA regulated), discharges exceeding applicable reportable quantities established in 17-761.460(2) F.A.C., within one working day of the discovery.
- Within one working day of discovery of suspected releases confirmed by: (a) released regulated substances or pollutants discovered in the surrounding area, (b) unusual and unexplained storage system operating conditions, (c) monitoring results from a leak detection method or from a tank closure assessment that indicate a release may have occurred, or (d) manual tank gauging results for tanks of 550 gallons or less, exceeding ten gallons per weekly test or five gallons averaged over four consecutive weekly tests.

Mail to the DER District Office in your area listed on the reverse side of this form

PLEASE PRINT OR TYPE
Complete all applicable blanks

1. DER Facility ID Number: _____ 2. Tank Number: _____ 3. Date: 01/31/97
4. Facility Name: BLDG 2993

Facility Owner or Operator: BULK FUELING

Facility Address: WASP RD

Telephone Number: (904) 623-7246 County: SANTA ROSA

Mailing Address: PO BOX 7183 Langley ST, NAS Whiting Field, MILTON FL 321

5. Date of receipt of test results or discovery: 01/17/97 (Previously 09/95 by G. Swan) month/day/year

6. Method of initial discovery. (circle one only)

A. Liquid detector (automatic or manual)

D. Emptying and inspection.

F. Vapor or visible signs of a discharge in the vicinity

B. Vapor detector (automatic or manual)

E. Inventory control.

☒ G. Closure: _____ (explain)

C. Tightness test (underground tanks only).

H. Other: Contamination Assessment Report by G. Swan 09/1995

7. Estimated number of gallons discharged: UNKNOWN

8. What part of storage system has leaked? (circle all that apply) A. Dispenser B. Pipe C. Fitting D. Tank ☒ E. Unknown

9. Type of regulated substance discharged. (circle one)

A. leaded gasoline

D. vehicular diesel

L. used/waste oil

V. hazardous substance includes pesticides, ammonia, chlorine and derivatives (write in name or Chemical Abstract Service CAS number) _____

B. unleaded gasoline

F. aviation gas

M. diesel

C. gasohol

☒ G. jet fuel

O. new/lube oil

Z. other (write in name) _____

10. Cause of leak. (circle all that apply)

☒ A. Unknown

C. Loose connection

E. Puncture

G. Spill _____

I. Other (specify) _____

B. Spill

D. Corrosion

F. Installation failure

H. Overfill _____

11. Type of financial responsibility. (circle one)

A. Third party insurance provided by the state insurance contractor

(C.) Not applicable

B. Self-insurance pursuant to Chapter 17-769.500 F.A.C.

D. None

12. To the best of my knowledge and belief all information submitted on this form is true, accurate, and complete.

LESLIE J NICHOLS

Printed Name of Owner, Operator or Authorized Representative

Signature of Owner, Operator or Authorized Representative

Northwest District
100 Government Center
Tallahassee, Florida 32301-3794
904-438-6300

Northwest District
7825 Baymeadows Way, Suite B 250
Jacksonville, Florida 32207
904-718-4200

Central District
3319 Macquie St. Suite 232
Orlando, Florida 32835-3767
407-894-7535

Southwest District
4570 Oak Forest Blvd.
Tampa, Florida 33610-7347
813-423-5541

South District
2709 Bay St.
Fort Myers, Florida 33901-3800
813-332-0978

Southeast District
1802 S. Congress Ave. Suite A
West Palm Beach, Florida 33406
407-633-2870

Underground Storage Tank Installation and Removal Form For Certified Contractors

Pollutant Storage System Specialty Contractors as defined in Section 409.113, Florida Statutes (Certified contractors as defined in Section 17-761.200, Florida Administrative Code) shall use this form to certify that the installation, replacement or removal of the storage tank system(s) located at the address listed below was performed in accordance with Department Reference Standards.

General Facility Information

- DER Facility Identification No.: _____
- Facility Name: 2993 BULK FUELING Telephone: (____) _____
- Street Address (physical location): WASP STREET
- Owner Name: UNITED STATE NAVY R.O.I.C.C Telephone: (____) _____
- Owner Address: BLDG 1416 7183 LANGLEY ST NAS WHITING FIELD MILTON FL 32570
- Number of Tanks: a. Installed at this time _____ b. Removed at this time 2
- Tank(s) Manufactured by: UNKNOWN
- Date Work Initiated: DECEMBER 10, 1996 9. Date Work Completed: DECEMBER 11, 1996

Underground Pollutant Tank Installation Checklist

Please certify the completion of the following installation requirements by placing an (X) in the appropriate box.

- The tanks and piping are corrosion resistant and approved for use by State and Federal Laws. ☐
- Excavation, backfill and compaction completed in accordance with NFPA (National Fire Protection Association) 30(87), API (American Petroleum Institute) 1615, PEI (Petroleum Equipment Institute) RP100-87 and the manufacturers' specifications. ☐
- Tanks and piping pretested and installed in accordance with NFPA 30(87), API 1615, PEI/RP100(87) and the manufacturers' specifications. ☐
- Steel tanks and piping are cathodically protected in accordance with NFPA 30(87), API 1632, UL (Underwriters Laboratory) 1746, STI (Steel Tank Institute) R892-89 and the manufacturer's specifications. ☐
- Tanks and piping tested for tightness after installation in accordance with NFPA 30(87) and PEI/RP100-87. ☐
- Monitoring well(s) or other leak detection devices installed and tested in accordance with Section 17-761.640, Florida Administrative Code (F.A.C.) ☐
- Spill and overfill protection devices installed in accordance with Section 17-761.500, F.A.C. ☐
- Secondary containment installed for tanks and piping as applicable in accordance with Section 17-761.500, F.A.C. ☐

Please Note: The numbers following the abbreviations (e.g. API 1615) are publication or specification numbers issued by these institutions.

Underground Pollutant Tank Removal Checklist

Closure assessment performed in accordance with Section 17-761.800, F.A.C.

- Underground tank removed and disposed of as specified in API 1604 in accordance with Section 17-761.800, F.A.C.

DER Form	17-761.800(5)
Form Title	Underground Storage Tank Installation & Removal Form for Certified Contractors
Effective Date	December 10, 1990
DER Application No.	(Filed in by DER)

Certification

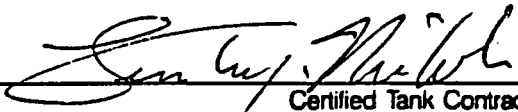
I hereby certify and attest that I am familiar with the facility that is registered with the Florida Department of Environmental Regulation; that to the best of my knowledge and belief, the tank installation, replacement or removal at this facility was conducted in accordance with Chapter 489 and Section 376.303, Florida Statutes and Chapter 17-761, Florida Administrative Code (and its adopted reference sources from publications and standards of the National Fire Protection Association (NFPA), the American Petroleum Institute (API), the National Association of Corrosion Engineers (NACE), American Society for Testing and Materials (ASTM); Petroleum Equipment Institute (PEI); Steel Tank Institute (STI); Underwriters Laboratory (UL); and the tank and integral piping manufacturers' specifications; and that the operations on the checklist were performed accordingly.

LESLIE J. NICHOLS

(Type or Print)

Certified Pollutant Tank Contractor Name

Pollutant Storage System Specialty Contractor License Number (PSSSC)



Certified Tank Contractor Signature

PC-C055743

PSSSC Number

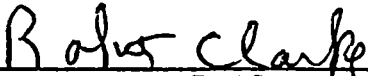
1-14-97

Date

ROBERT CLARKE

(Type or Print)

Field Supervisor Name



Field Supervisor Signature

1-14-97

Date

1-14-97

Date

The owner or operator of the facility must register the tanks with the Department at least 10 days before the installation. The installer must submit this form no more than 30 days after the completion of installation to the Department of Environmental Regulation at the address printed at the top page one.



DER Form 8	12-701-0000
Form Title	Closure Assessment Form
Effective Date	December 10, 1990
DER Application No.	(Filled in by DER)

Closure Assessment Form

Owners of storage tank systems that are replacing, removing or closing in place storage tanks shall use this form to demonstrate that a storage system closure assessment was performed in accordance with Rule 17-761 or 17-762, Florida Administrative Code. Eligible Early Detection Incentive (EDI) and Reimbursement Program sites do not have to perform a closure assessment.

Please Print or Type
Complete All Applicable Blanks

- Date: 1-14-97
- DER Facility ID Number: _____
- County: SANTA ROSA
- Facility Name: BLDG 2993
- Facility Owner: BULK FUELING
- Facility Address: WASP RD
- Mailing Address: BOICC, NAS WHITING FIELD, 7183 LANGLEY ST, MILTON FL 32570
- Telephone Number: (904) 623-7246
- Facility Operator: BULK FUELING
- Are the Storage Tank(s): (Circle one or both) A. Aboveground or (B) Underground
- Type of Product(s) Stored: FUEL JP-5
- Are the Tank(s): (Circle one) A. Replaced (B.) Removed C. Closed In Place D: Upgraded (aboveground tanks only)
- Number of Tanks Closed: 1
- Age of Tanks: UNKNOWN

Facility Assessment Information

Yes No Not Applicable

- | | | |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
- Is the facility participating in the Florida Petroleum Liability Insurance and Restoration Program (FPLIRP)?
 - Was a Discharge Reporting Form submitted to the Department?
If yes, When: _____ Where: _____
 - Is the depth to ground water less than 20 feet?
 - Are monitoring wells present around the storage system?
If yes, specify type: ☐ Water monitoring ☐ Vapor monitoring
 - Is there free product present in the monitoring wells or within the excavation?
 - Were the petroleum hydrocarbon vapor levels in the soils greater than 500 parts per million for gasoline?
Specify sample type: ☐ Vapor Monitoring wells ☐ Soil sample(s)
 - Were the petroleum hydrocarbon vapor levels in the soils greater than 50 parts per million for diesel/kerosene?
Specify sample type: ☐ Vapor Monitoring wells ☐ Soil sample(s)
 - Were the analytical laboratory results of the ground water sample(s) greater than the allowable state target levels?
(See target levels on reverse side of this form and supply laboratory data sheets)
 - If a used oil storage system, did a visual inspection detect any discolored soil indicating a release?
 - Are any potable wells located within 1/4 of a mile radius of the facility?
 - Is there a surface water body within 1/4 mile radius of the site? If yes, Indicate distance: _____

CLOSURE ASSESSMENT REVIEW CHECKLIST

Mailing Address: _____

Is this an EDI/PLIRP/ATRP site? (circle one)

Storage Tank Registration/Notification Form

Discharge Notification/Reporting Form?

Closure Assessment Form?

Was an OVA used on site? FID/PID (circle one)
(w/carbon filter?)

Were any OVA readings greater than 50 ppm or 500 ppm? (circle one that applies)

Was there visual evidence of contamination/discharge? (i.e. soil staining, sheen, tank holes, etc.)

Was excessively contaminated soil removed? If so, how much? _____
(IRA information received)

Were manifests for soil, water, sludge &/or tanks received?

Is the depth to groundwater given? If so what _____.

Was groundwater analysis done? 601 602 610 418.1 (circle test(s)
done)

Were any results greater than SRLs? If so which?

All lab analyses?

All OVA readings?

Lab quality assurance and control statement or #?

Field quality assurance and control statement?

storage tank system?

dispensers?

monitoring wells?

buildings/roads?

storm drains?

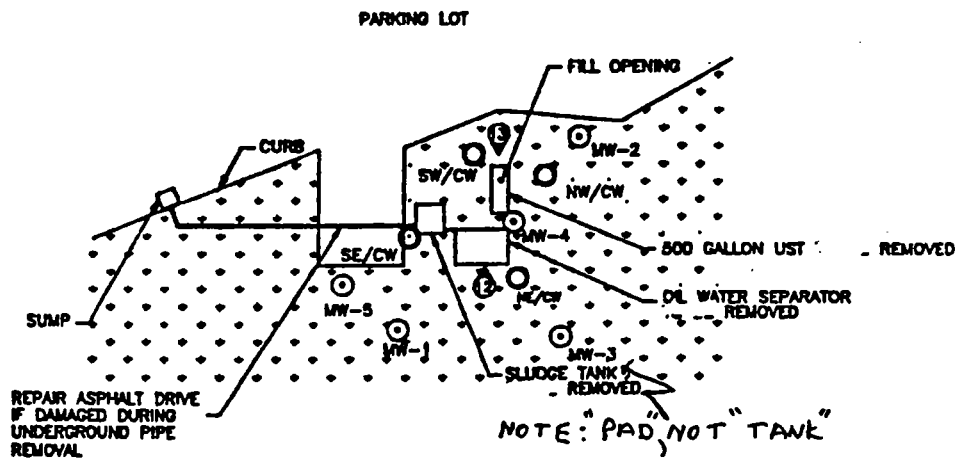
(sampling? soil) & groundwater (circle)

BUILDING 2993

NOT TO SCALE



LEGEND	
	GRASS
	PHOTO NUMBER/DIRECTION
	MONITORING WELL (MW)
	COMPLIANCE WELLS (CW)
	(SE = SOUTHEAST)
	(SW = SOUTHWEST)
	(NE = NORTHEAST)
	(NW = NORTHWEST)
BY REMOVED	



PETROLEUM CONTAMINATION
INITIAL REMEDIAL ACTION NOTIFICATION FORM

This notification provides written confirmation of initial remedial action (IRA) as required by Chapter 17-770.300(5) and (8), Florida Administrative Code. Notification must be within three working days of initiation of an IRA. Upon completion of the IRA, an Initial Remedial Action Report should be submitted.

I. Facility Name: BUILDING 2993
Facility Address: WHITINGFIELD NAVAL AIR STATION MILTON, FL
DER Facility Number (if applicable): _____
Date of Initiation of IRA: 01/12/1997

II. FREE PRODUCT RECOVERY (Please provide brief responses.) NONE

- A. Type of Product Discharged: _____
B. Estimated Quantity Lost: _____ gallons
C. Product Thickness in Wells, Boreholes, Excavations, or Utility Conduits (Attach Site Plan indicating locations and depths): _____
D. Method of Product Recovery: _____
E. Type of Discharge During Product Recovery: _____
F. Type of Treatment and Expected Effluent Quality from Any Discharge: None
G. Quantity and Disposal of Recovered Product: _____

III. SOIL EXCAVATION

- A. Estimated Volume of Contaminated Soil Excavated (Attach Site Plan indicating location of excavation(s) and soil borings): 34.45 cubic yards (in place) (See Closure Report For sketch)

B. Type of Product in Soil: J P 5

C. Method Used to Determine Excess Soil Contamination: OVA

D. Method of Treatment or Disposal of Contaminated Soil: LANDFILL

IV. REPORTING

This notification should be submitted to the appropriate Local Program, if any, or to:

Florida Department of Environmental Regulation
Bureau of Waste Cleanup
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

[Signature]
Person Completing Form

President
Title, Affiliation

[Signature] 2-11-97
Signature, Date

PETROLEUM CONTAMINATION
INITIAL REMEDIAL ACTION REPORT FORM

An Initial Remedial Action report, summarizing the initial remedial action (IRA), should be prepared to satisfy the requirements of Chapters 17-770.630(1)14; 17-773.500(1)(a)4; and 17-773.500(2)(a)4, Florida Administrative Code, (FAC). This form may be used for the IRA report. The report should be sent to the appropriate local program and:

Florida Department of Environmental Regulation
Bureau of Waste Cleanup
Engineering Support Section
2600 Blair Stone Road
Tallahassee, FL 32399-2400

- I. FACILITY NAME: BUILDING #. 2993
Facility Address: WASP Bldg, NAS W. HILTING FIELD, MILTON FL
DER Facility Number (if applicable):
Date IRA Initiated: 12/26/1996 Date IRA Completed: 01/15/1997
- II. FREE PRODUCT RECOVERY NONE
- A. Type(s) of Product Discharged:
- B. Quantity
1. Estimated Gallons Lost:
 2. Gallons Recovered: through (date)
 3. Attach Exhibit Indicating Amount of Product Recovered, Dates and Cumulative Totals.
- C. Attach a Scaled Site Plan, Indicating the Locations and Product Thickness in Wells, Boreholes, Excavations, or Utility Conduits and Wells Utilized for Recovery of Free Product.
- D. Method of Product Recovery:
- E. Type of Discharge During Product Recovery:

F. Type of Treatment, i.e., Oil/Water Separator: none

G. Attach Written Proof of Proper Disposal of Recovered Product: _____

III. SOIL EXCAVATION

NOTE: Soil shall be defined as excessively contaminated using the procedure stated in Chapter 17-770.200(2), FAC. Representative soil sampling shall be performed as close to the time of excavation as possible, but at no time shall exceed three (3) months prior to the start of excavation. Stockpiled soils greater than thirty (30) days on site waiting for treatment and disposal, must be re-sampled immediately prior to disposal to assure soils are still excessively contaminated.

If soil sampling data indicates that the amount of soil that is excessively contaminated exceeds 1500 cubic yards, treatment of all excessively contaminated soil at the site shall be addressed in a remedial action plan, and no soil IRA activities shall be performed except for the removal of soils in the immediate vicinity of the tanks.

Only soil above the ambient water table at the time of excavation can be considered as excessively contaminated soil.

Unless the established weight per unit volume of 1.4 tons/cubic yard (as referenced in FAC Rule 17-775) is used for the excavated soil, the weight per unit volume must be determined by a field test (in which an accurately measured volume of soil is weighed) at the time of excavation.

A. Volume of Contaminated Soil Excavated in Cubic Yards:

34.45. Dimensions Including Depth of Excavation(s):
10 FT by 15.5 FT by 6 FT in DEPTH

NOTE: Attach written proof from the Department in the form of an Alternate Procedure Approval Order authorizing excavating over 1500 cubic yards if applicable. Authorization must be prior to the excavation of soils.

B. Type(s) of Product in Soil: HYDROCARBON (TPS)

MAY 1992

Florida Department of Environmental Regulation

UNIT - INEC
01-20-91 13:54

PHONE NO. : 9549730310
2904 283 7100

Jan. 20 1997 02:37PM P2

Waste Management Inc. - Florida
Industrial Waste Service Center
4011 W. 46th Street
Miramar Beach, FL 33573



A Waste Management Company

NON- HAZARDOUS MANIFEST

SC No 6653

Generator NAVAL AIR STATION - WILMINGTON
Address Bldg. 2993 COLUMBIA FUELING
RAILWAY ST MILTON FL 32570
City RAILWAY ST MILTON FL 32570
State FL 32570
Generator Signature [Signature]

Driver Name (Print) [Signature]

Truck Number [Signature]

Driver Signature [Signature]

Delivery Date 1-17-97

Weight

Description of Waste Materials	Profile Number	Account #	Total Quantity
<u>PETROLEUM CONTAMINATED SOIL</u>	<u>469309</u>	<u>00-5707</u>	<u>17.40</u>

Receiver Name SPRINGHILL REGIONAL LANDFILL
Address 4945 Hwy 273, GRACKNILE FL
Phone Number (904) 263-7100

Receiver acknowledges receipt of the above-described materials.

Name of Authorized (Print) [Signature]

Signature [Signature]

Receipt Date 1/17/97

WHITE - GENERATOR

YELLOW - LANDFILL

PINK - LANDFILL

GOLD - TRANSPORTER

Fax - copy TO 1-904-623-7515

01:11 - IMSC

01/20/91

13:54

804 263 7100

PHONE NO. : 9549730310

Jan. 20 1997 02:37PM P3
1000

Waste Management Int. - Florida
Industrial Waste Service Center
2900 N.W. 48th Street
Pompano Beach, FL 33373



A Waste Management Company

NON-HAZARDOUS MANIFEST

SC No 6654

GENERATOR INFORMATION TRANSPORTER INFORMATION

Generators NAVAL AIR STATION - WHEELER FIELD
Address Bldg 2998 (BUNKER BUILDING)
LANAIKY ST, MIAMI FL 33150
(954) 675-1644 P.O.#
Generators Signature R. E. Sullivan

Driver Name (Print) Farrell Clavers
Truck Number 101
I hereby acknowledge that the above-described materials
were received from the generator site were transported
without incident to the destination listed below.
Farrell Clavers 1-17-97
Driver Signature Delivery Date

Description of Waste Materials	Profile Number	Account #	Total Quantity	Weight
<u>PETROLEUM CONTAMINATED SOIL</u>	<u>469309</u>	<u>0005463</u>	<u>16.98</u>	

Site Name SPRINGHILL REGIONAL LANDFILL
Address 4945 Hwy 873, GRADSVILLE, FL
Phone Number (904) 263-7100

I hereby acknowledge receipt of the above-described materials.
[Signature]
Name of Authorized (Print)

[Signature]
Signature Receipt Date

WHITE - GENERATOR YELLOW - LANDFILL PINK - LANDFILL GOLD - TRANSPORTER

Fax Copy TO 11-904-623-7515

APPENDIX D

CLOSURE REPORT FOR PRODUCT LINE



JIM STIDHAM & ASSOCIATES, INC.

547 N. MONROE ST., SUITE 201 - POST OFFICE BOX 3547 - TALLAHASSEE, FLORIDA 32303-3547
TELEPHONE: 904/222-3975 FAX: 904/681-0560

**PRODUCT LINE CLOSURE
ASSESSMENT REPORT**

**UNITED STATES NAVAL AIR STATION
WHITING FIELD
MILTON, FLORIDA 32570**

FDEP FACILITY LD. #578516386

APRIL 12, 1996

PREPARED FOR:

**SANTA ROSA COUNTY STORAGE TANK PROGRAM
ESCAMBLA COUNTY PUBLIC HEALTH UNIT
1190 WEST LEONARD STREET, SUITE 2
PENSACOLA, FLORIDA 32501**

PREPARED BY:

JIM STIDHAM & ASSOCIATES, INC.

CLOSURE ASSESSMENT REPORT
UNITED STATES NAVAL AIR STATION
WHITING FIELD
FACILITY ID # 578516386

INTRODUCTION

On March 27, 1996 Jim Stidham & Associates, Inc. (JSA) began performance of closure assessment activities on a system of product lines that were once affiliated with two above ground storage tanks (ASTs) that are identified as Tank #2891 and Tank #2892. This AST facility and the associated product line system are located on the south side of Hornet Street, United States Naval Air Station, Whiting Field, Milton, Florida 32570 (Figure 1). The product line system extends from the northwest area of the AST facility that contains Tank #2891 and Tank #2892 to a pump station facility located on Hornet Street. The product line system then proceeds in a southwesterly direction along Hornet Street under Saratoga Street to a dispensing facility. The product line system was taken out of service and closed in place by Environmental Recovery, Inc. (ERI) and Minority Speciality Contractors Inc. (MSC).

JSA arrived on the site on March 27, 1996 and met with Eric Taylor of Minority Speciality Contractors to discuss the product line closure assessment at the above referenced facility. The product lines are constructed of metal and are located approximately three feet below land surfaces (BLS) in most areas. The product line system included in this closure assessment consists of two separate lines from the AST facility to the pump station building located along Hornet Street with a single 10-inch product line extending from this pump station facility to a product dispensing area. There is also a 4-inch product line connecting the two ASTs to a former dispensing area approximately 110 feet to the northeast of the AST facility. Figure 2 displays the product lines included in this closure assessment. Each of the two product lines that extend from the ASTs to the pump station line connects to both ASTs and contain valve stations at various locations between the ASTs and the pump station facility. One 8-inch product line services the northeast side of the AST facility and travels in a northwesterly direction to the southwest side of the pump station facility. A second 10-inch product line services the southwest side of the AST facility and extends from the AST in a northwesterly direction and connects to the southeast portion of the pump station facility. A 10-inch line extends in a southwesterly direction along Hornet Street from the pump station to a former dispensing facility located southwest of the junction of Hornet and Enterprise Streets. The following

information summarizes the activities that occurred at this facility as a part of this Product Line Closure Assessment Report.

SITE HISTORY

There is a total of four product line systems associated with the AST system at the above mentioned facility. The product lines at this facility were taken out of service through in-place closure by Environmental Recovery, Inc. (ERI) from February 26, 1996 to February 29, 1996. The product lines involved in this product line closure assessment were affiliated with two 231,000 gallon ASTs that contain Jet Petroleum #5 (JP-5).

PRODUCT LINE ASSESSMENT (PLCA)

Beginning on March 26, 1995 and concluding on March 29, 1996, JSA performed the product line closure assessment for these four product line systems that were affiliated with the two ASTs (Tank #2891 and Tank #2892). The two ASTs at this facility remain in service (Figure 2).

Soil samples were collected for organic volatile analysis (OVA) at the beginning and the end of each product line and also on a 100-foot interval basis along each product line. Additional soil samples were collected in the areas where product line direction changes occur and also in the areas of valve stations located along the product lines associated with this closure assessment. Soil samples were also collected in the vicinity of both the former rail loading area and the former dispensing area. For the purposes of this product line closure assessment report, the four product lines in question will be identified as System 1, System 2, System 3, and System 4. System 1 is identified as the product line extending from the dispensing area to the pump station facility. System 2 is identified as the product line that extends from the southeast side of the pump station facility to the southwest side of the AST facility. The product line that extends from the southwest area of the pump station facility to the northeast portion of the AST facility is identified as System 3. System 4 consists of the 4-inch product line that extends from the northeast area of the AST facility to a former rail loading area located approximately 110 feet to the northeast.

System 1 consists of approximately 1315 feet of 10 inch metal product lines. This product line maintains a consistent below gradient depth of approximately 3 feet except for an aboveground junction located near Soil Boring #13 (SB-13) and an exposed portion near the pump station facility.

A total of 17 soil borings was installed along this product line, beginning with SB-1 located near the dispensing facility and ending with SB-17 near the pump station facility. SB-2 was installed near a valve station that is located on a 45-degree direction change in the product line. All other soil borings are located on a 100-foot interval basis (or less depending upon obstructions such as roads and parking lots). Elevated OVA values were encountered in soil collected from SB-1, SB-12, and SB-17. Soil samples collected from the remaining soil borings indicated OVA readings below detection limits. Two additional soil borings were also installed around the pump station facility. These soil borings were installed to a depth of 7 feet BLS and revealed OVA readings below detection limits. Figure 3 displays the location of the soil borings along the product line located within System 1.

The second system, System 2, consists of approximately 605 feet of 10 inch metal product lines. With the exception of an exposed area near the pump station facility, this product line is approximately 3 feet below land surface (BLS) throughout its extent. Soil borings SB-18 through SB-24 and SB-36 and SB-37 were installed along the product line on a 100-foot interval basis to include product line direction changes and valve stations. SB-18 was installed on one end of the product line near the pump station facility and SB-37 was installed at the opposite end near the AST area. All soil borings, with the exception of SB-18, were installed to a depth of 7 feet BLS for collection of soil for OVA analysis. SB-18 was installed to a depth of only four feet BLS since the product line is exposed above land surface in this area. All soil samples collected from these soil borings revealed OVA values below detection limits. Figure 4 displays the location of these soil borings along the product line designated as System 2.

System 3 contains approximately 795 feet of 8 inch metal product lines. The majority of this product line is approximately 3 feet BLS except for the portion of the product line located within the AST facility. The depth of the product line within the AST facility is approximately 8 feet BLS. A total of eleven soil borings were installed along this product line system, beginning with SB-25 near the pump station facility and ending with SB-35 in the area of the AST facility. In the area where this product line is located approximately 3 feet BLS, soil borings SB-25 through SB-32 were installed to a depth of 7 feet BLS. Within the area of the AST facility where this product line is located approximately 8 feet BLS, soil borings SB-33, SB-34, and SB-35 were installed to a depth of 12 feet BLS. These three soil borings were installed in the immediate vicinity of valve stations. All of the soil borings along System 3 were installed on a 100-foot interval basis and included all product line direction changes and valve stations. All soil samples collected for OVA analysis along this product line contained values below detection limits. The locations of these soil borings are displayed in Figure 5.

The product line contained within System 4 consists of metal 4 inch piping that extends from the northeast portion of the AST facility to a former rail loading area located approximately 110 feet to the northeast side of the AST facility. At one time, this AST facility was supplied with JP-5 products by way of rail transport. The product line designated as System 4 once served as an off loading area for the JP-5 fuel transported to the AST facility by rail. This system contains six off loading junctions, all of which combine into one 4-inch product line that was once connected to the AST facility. A total of seven soil borings (SB-39 through SB-45) were installed in the rail loading area of this product line with one soil boring adjacent to each rail loading junction and one soil boring in the area where this product line changes direction to travel to the AST facility. An additional soil boring (SB-38) was also placed between the rail loading area and the AST facility. Soil samples collected for OVA analysis from SB-39 through SB-45 revealed excessive levels of petroleum contamination from soil collected at depths of three and four feet BLS. Soil collected for analysis from SB-38 revealed excessive levels of petroleum contamination from soil collected at a depth of 7 feet BLS. Figure 6 displays the product line designated as System 4 and the soil borings installed along this product line.

Additional soil borings were also placed in the area of the former dispensing facility. A total of six soil borings were installed around this former dispensing area, including SB-1 which was installed in the area where the product line joins the dispensing area. Soil samples taken for OVA analysis from SB-46 through SB-50 contained values below detection limits. However, as previously mentioned, SB-1 contained excessive levels of petroleum contamination at a depth of 7 feet BLS. The locations for the soil borings around this dispensing facility are displayed in Figure 7.

The threshold for excessively contaminated soil was set at 50 parts per million (ppm) following Chapter 62-770.200(2) for mixed product group contamination sources. The Closure Assessment Form is included in Appendix A.

The soil collected for analysis was scanned with a Foxboto Century 128, organic vapor analyzer (OVA). This instrument is a flame ionization detector (FID) used to conduct field analysis of soil samples. Standard manufacturers operating procedures were followed and all field calibrations were made according to manufacturer's recommendations.

The soil samples were sealed in half-filled 16 ounce glass jars and the OVA readings were taken in the headspace above the soil as recommended by FDEP's Guidelines for Assessments and Remediation of Petroleum Contaminated Soils and in accordance with Florida Administrative Code

(FAC) Chapter 62-770.200(2). Duplicate soil samples were collected from each test site so that samples could be analyzed for total biogenic content using a carbon filter attachment. Total Volatile Hydrocarbons (TVH) were then determined by subtracting the biogenic reading from the OVA reading.

SUMMARY

During Product Line Closure Assessment activities of the product line systems affiliated with tank #2891 and tank #2892, JSA installed fifty-two soil borings in the soil located around the product lines involved in this product line closure assessment. Soil borings were installed along the product lines on a 100-foot interval basis. Soil borings were also installed in the areas of product line direction changes and also in the areas of valve junction stations and product line termination areas. While the majority of the soil collected for OVA analysis revealed values below detection limits, soil samples collected from SB-1, SB-12, SB-17, SB-38, SB-39, SB-40, SB-41, SB-42, SB-43, SB-44, and SB-45 revealed excessive levels of petroleum contamination (>50 ppm). A Discharge Reporting Form has been prepared for submittal and is included in Appendix B.

TABLES

WHITING FIELD
UNITED STATES NAVAL AIR STATION
MILTON, FLORIDA
FDEP FACILITY ID #: 578516386

TABLE 1

SB LOCATION	DEPTH (ft)	OVA (ppm)	BIO (ppm)	TVH (ppm)	SOIL DESCRIPTION
SB - 1	1	<1	<1	<1	TAN SAND
SB - 1	3	<1	<1	<1	TAN SAND
SB - 1	5	<1	<1	<1	TAN SAND
SB - 1	7	640	29	611	TAN SANDY CLAY
SB - 2	1	<1	<1	<1	TAN SAND
SB - 2	3	<1	<1	<1	TAN SAND
SB - 2	5	<1	<1	<1	TAN SAND
SB - 2	7	<1	<1	<1	TAN SAND
SB - 3	1	<1	<1	<1	TAN & BROWN SANDY CLAY
SB - 3	3	<1	<1	<1	TAN SAND
SB - 3	5	<1	<1	<1	TAN SAND
SB - 3	7	<1	<1	<1	TAN SAND
SB - 4	1	<1	<1	<1	TAN & ORANGE SANDY CLAY
SB - 4	3	<1	<1	<1	TAN SAND
SB - 4	5	<1	<1	<1	TAN SAND
SB - 4	7	<1	<1	<1	TAN SAND
SB - 5	1	<1	<1	<1	TAN SAND
SB - 5	3	<1	<1	<1	DARK SAND
SB - 5	5	<1	<1	<1	TAN SAND
SB - 5	7	<1	<1	<1	TAN SAND
SB - 6	1	<1	<1	<1	TAN SANDY CLAY
SB - 6	3	<1	<1	<1	TAN SAND
SB - 6	5	<1	<1	<1	TAN SAND
SB - 6	7	<1	<1	<1	BROWN CLAYEY SAND
SB - 7	1	<1	<1	<1	BROWN SANDY CLAY
SB - 7	3	<1	<1	<1	TAN SAND
SB - 7	5	<1	<1	<1	TAN SAND
SB - 7	7	<1	<1	<1	TAN & BROWN CLAYEY SAND
SB - 8	1	<1	<1	<1	TAN & BROWN SANDY CLAY
SB - 8	3	<1	<1	<1	TAN SAND
SB - 8	5	<1	<1	<1	TAN SAND
SB - 8	7	<1	<1	<1	TAN & BROWN CLAYEY SAND
SB - 9	1	<1	<1	<1	TAN & BROWN SANDY CLAY
SB - 9	3	<1	<1	<1	TAN SAND
SB - 9	5	<1	<1	<1	TAN SAND
SB - 9	7	<1	<1	<1	BROWN & ORANGE SAND
SB - 10	1	<1	<1	<1	TAN & ORANGE SANDY CLAY
SB - 10	3	<1	<1	<1	TAN SAND
SB - 10	5	<1	<1	<1	TAN SAND
SB - 10	7	<1	<1	<1	TAN & BROWN CLAYEY SAND
					TAN & BROWN SANDY CLAY

OVA - Organic Vapor Analyzer
B - Biogenic Reading
TVH - Total Volatile Hydrocarbons
PPM - Parts Per Million
SB - Soil Boring

WHITING FIELD
UNITED STATES NAVAL AIR STATION
MILTON, FLORIDA
FDEP FACILITY ID #: 578516386

TABLE 1 (CONT.)

SB LOCATION	DEPTH (ft)	OVA (ppm)	BIO (ppm)	TVH (ppm)	SOIL DESCRIPTION
SB - 11	1	<1	<1	<1	TAN SAND
SB - 11	3	<1	<1	<1	TAN SAND
SB - 11	5	<1	<1	<1	BROWN SAND
SB - 11	7	<1	<1	<1	TAN & BROWN SANDY CLAY
SB - 12	1	<1	<1	<1	TAN SAND
SB - 12	3	<1	<1	<1	TAN SAND
SB - 12	5	250	2	248	TAN & GREY SAND
SB - 12	7	440	4.4	435.6	TAN & GREY SAND
SB - 13	1	<1	<1	<1	TAN SAND
SB - 13	3	<1	<1	<1	TAN SAND
SB - 13	5	<1	<1	<1	TAN SAND
SB - 13	7	<1	<1	<1	TAN SANDY CLAY
SB - 14	1	<1	<1	<1	TAN SAND
SB - 14	3	<1	<1	<1	TAN SANDY CLAY
SB - 14	5	<1	<1	<1	TAN SAND
SB - 14	7	<1	<1	<1	TAN SANDY CLAY
SB - 15	1	<1	<1	<1	DARK SAND
SB - 15	3	<1	<1	<1	TAN SAND
SB - 15	5	<1	<1	<1	TAN SANDY CLAY
SB - 15	7	<1	<1	<1	TAN SANDY CLAY
SB - 16	1	<1	<1	<1	REDISH SAND
SB - 16	3	<1	<1	<1	TAN SANDY CLAY
SB - 16	5	<1	<1	<1	TAN SANDY CLAY
SB - 16	7	<1	<1	<1	TAN SANDY CLAY
SB - 17	1	<1	<1	<1	TAN SAND
SB - 17	3	>1000	<1	>1000	GREY & TAN SANDY CLAY
SB - 17	4	>1000	<1	>1000	GREY & TAN SANDY CLAY
SB - 18	1	<1	<1	<1	TAN SAND
SB - 18	3	<1	<1	<1	TAN & BROWN CLAYEY SAND
SB - 18	4	1.2	<1	1.2	BROWN SANDY CLAY
SB - 19	1	<1	<1	<1	TAN SAND
SB - 19	3	<1	<1	<1	TAN SAND
SB - 19	5	<1	<1	<1	GREY & WHITE CLAYEY SAND
SB - 19	7	<1	<1	<1	GREY & WHITE CLAYEY SAND
SB - 20	1	<1	<1	<1	TAN SAND
SB - 20	3	<1	<1	<1	TAN SAND
SB - 20	5	<1	<1	<1	TAN & BROWN CLAYEY SAND
SB - 20	7	<1	<1	<1	TAN & BROWN SANDY CLAY
SB - 21	1	<1	<1	<1	TAN SAND
SB - 21	3	<1	<1	<1	TAN SAND

OVA - Organic Vapor Analyzer
BIO - Biogenic Reading
TVH - Total Volatile Hydrocarbons
PPM - Parts Per Million
SB - Soil Boring

WHITING FIELD
UNITED STATES NAVAL AIR STATION
MILTON, FLORIDA
FDEP FACILITY ID #: 578516386

TABLE 1 (CONT.)

SB LOCATION	DEPTH (ft)	OVA (ppm)	BIO (ppm)	TVH (ppm)	SOIL DESCRIPTION
SB - 21	5	<1	<1	<1	BROWN CLAYEY SAND
SB - 21	7	<1	<1	<1	BROWN SANDY CLAY
SB - 22	1	N/A	N/A	N/A	
SB - 22	3	<1	<1	<1	TAN SAND
SB - 22	5	<1	<1	<1	TAN & BROWN CLAYEY SAND
SB - 22	7	<1	<1	<1	TAN & BROWN SANDY CLAY
SB - 23	1	<1	<1	<1	TAN SAND
SB - 23	3	<1	<1	<1	TAN SAND
SB - 23	5	<1	<1	<1	BROWN CLAYEY SAND
SB - 23	7	<1	<1	<1	BROWN SANDY CLAY
SB - 24	1	<1	<1	<1	TAN SAND
SB - 24	3	<1	<1	<1	TAN SAND
SB - 24	5	<1	<1	<1	BROWN CLAYEY SAND
SB - 24	7	<1	<1	<1	BROWN SANDY CLAY
SB - 25	1	<1	<1	<1	TAN SAND
SB - 25	3	<1	<1	<1	TAN SAND
SB - 25	5	<1	<1	<1	BROWN CLAYEY SAND
SB - 25	7	<1	<1	<1	BROWN SANDY CLAY
SB - 26	1	<1	<1	<1	TAN SAND
SB - 26	3	<1	<1	<1	TAN SAND
SB - 26	5	<1	<1	<1	TAN SANDY CLAY
SB - 26	7	<1	<1	<1	TAN SANDY CLAY
SB - 27	1	<1	<1	<1	DARK SAND
SB - 27	3	<1	<1	<1	TAN SAND
SB - 27	5	<1	<1	<1	TAN SANDY CLAY
SB - 27	7	<1	<1	<1	TAN SANDY CLAY
SB - 28	1	<1	<1	<1	TAN SAND
SB - 28	3	<1	<1	<1	TAN SAND
SB - 28	5	<1	<1	<1	TAN SANDY CLAY
SB - 28	7	<1	<1	<1	TAN SANDY CLAY
SB - 29	1	<1	<1	<1	TAN SAND
SB - 29	3	<1	<1	<1	TAN SAND
SB - 29	5	<1	<1	<1	TAN SANDY CLAY
SB - 29	7	<1	<1	<1	TAN SANDY CLAY
SB - 30	1	<1	<1	<1	TAN SAND
SB - 30	3	<1	<1	<1	TAN SAND
SB - 30	5	<1	<1	<1	RED SANDY CLAY
SB - 30	7	<1	<1	<1	RED SANDY CLAY
SB - 31	1	<1	<1	<1	TAN SAND
SB - 31	3	<1	<1	<1	TAN SAND

OVA - Organic Vapor Analyzer
- Biogenic Reading
TVH - Total Volatile Hydrocarbons
PPM - Parts Per Million
SB - Soil Boring

WHITING FIELD
UNITED STATES NAVAL AIR STATION
MILTON, FLORIDA
FDEP FACILITY ID #: 578516386

TABLE 1 (CONT.)

SB LOCATION	DEPTH (ft)	OVA (ppm)	BIO (ppm)	TVH (ppm)	SOIL DESCRIPTION
SB - 31	5	<1	<1	<1	RED SANDY CLAY
SB - 31	7	<1	<1	<1	RED SANDY CLAY
SB - 32	1	<1	<1	<1	DARK SAND
SB - 32	3	<1	<1	<1	TAN SAND
SB - 32	5	<1	<1	<1	TAN SANDY CLAY
SB - 32	7	<1	<1	<1	TAN SANDY CLAY
SB - 33	8	<1	<1	<1	GRAVEL & SAND FILL
SB - 33	10	<1	<1	<1	BROWN SANDY CLAY
SB - 33	12	<1	<1	<1	BROWN SANDY CLAY
SB - 34	8	<1	<1	<1	GRAVEL & SAND FILL
SB - 34	10	<1	<1	<1	BROWN SANDY CLAY
SB - 34	12	<1	<1	<1	BROWN SANDY CLAY
SB - 34	14	<1	<1	<1	BROWN SANDY CLAY
SB - 34	16	<1	<1	<1	BROWN SANDY CLAY
SB - 34	18	<1	<1	<1	BROWN SANDY CLAY
SB - 34	20	<1	<1	<1	BROWN SANDY CLAY (DAMP)
SB - 35	8	<1	<1	<1	GRAVEL & SAND FILL
SB - 35	10	<1	<1	<1	BROWN SANDY CLAY
SB - 35	12	<1	<1	<1	BROWN SANDY CLAY
SB - 36	1	<1	<1	<1	TAN SAND
SB - 36	3	<1	<1	<1	TAN SAND
SB - 36	5	<1	<1	<1	BROWN CLAYEY SAND
SB - 36	7	<1	<1	<1	BROWN SANDY CLAY
SB - 36	1	<1	<1	<1	BROWN SAND
SB - 37	3	<1	<1	<1	BROWN SAND
SB - 37	5	<1	<1	<1	RED CLAYEY SAND
SB - 37	7	<1	<1	<1	RED SANDY CLAY
SB - 38	1	<1	<1	<1	TAN SAND
SB - 38	3	<1	<1	<1	TAN SAND
SB - 38	5	<1	<1	<1	TAN SANDY CLAY
SB - 38	7	300	120	180	DARK SANDY CLAY
SB - 39	1	<1	<1	<1	TAN SAND
SB - 39	3	190	8.6	181.4	DARK SANDY CLAY
SB - 39	4	280	15	265	DARK SANDY CLAY
SB - 40	1	<1	<1	<1	TAN SANDY CLAY
SB - 40	3	<1	<1	<1	TAN SANDY CLAY
SB - 40	4	670	32	638	GREY & TAN SANDY CLAY
SB - 41	1	<1	<1	<1	TAN SAND
SB - 41	3	68	<1	<1	GREY & TAN SANDY CLAY
SB - 41	4	>1000	62	>938	GREY & TAN SANDY CLAY

OVA - Organic Vapor Analyzer
BIO - Biogenic Reading
TVH - Total Volatile Hydrocarbons
PPM - Parts Per Million
SB - Soil Boring

WHITING FIELD
UNITED STATES NAVAL AIR STATION
MILTON, FLORIDA
FDEP FACILITY ID #: 578516386

TABLE 1 (CONT.)

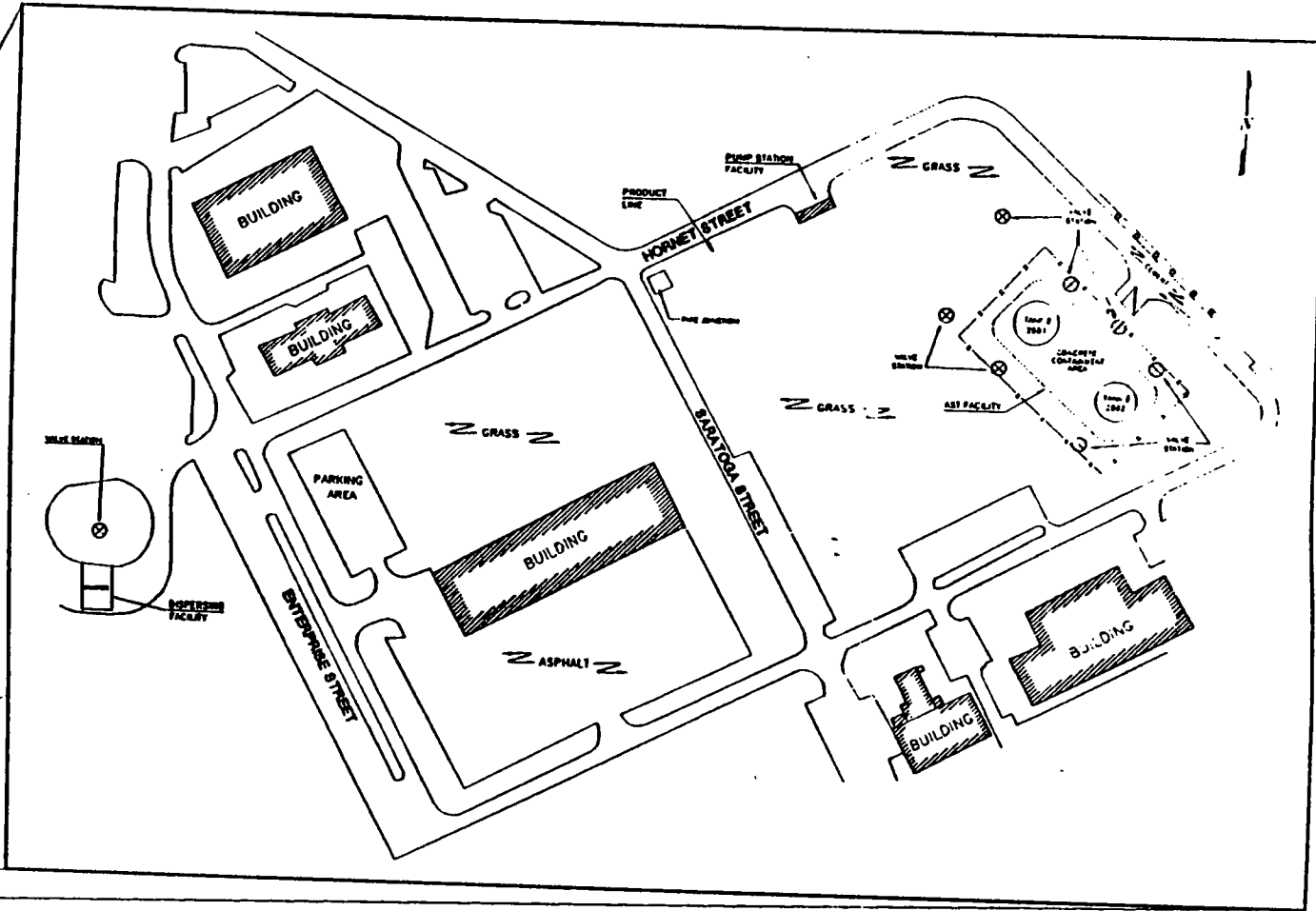
SB LOCATION	DEPTH (ft)	OVA (ppm)	BIO (ppm)	TVH (ppm)	SOIL DESCRIPTION
SB - 42	1	<1	<1	<1	TAN & BROWN SAND
SB - 42	3	>1000	360	>640	GREY SAND
SB - 42	4	500	60	440	GREY SAND
SB - 43	1	21	9.3	11.7	BROWN SAND
SB - 43	3	>1000	120	>880	GREY SAND
SB - 43	4	>1000	28	>972	GREY SAND
SB - 44	1	29	11	18	TAN SAND
SB - 44	3	150	215	INV	GREY SAND
SB - 44	4	320	140	180	GREY SAND
SB - 45	1	<1	<1	<1	BROWN SAND
SB - 45	3	90	36	54	GREY SAND
SB - 45	4	110	26	84	GREY SAND
SB - 46	1	<1	<1	<1	TAN SAND
SB - 46	3	<1	<1	<1	TAN SAND
SB - 46	5	<1	<1	<1	BROWN CLAYEY SAND
SB - 46	7	<1	<1	<1	BROWN SANDY CLAY
SB - 47	1	<1	<1	<1	TAN SAND
SB - 47	3	<1	<1	<1	TAN SAND
SB - 47	5	<1	<1	<1	BROWN CLAYEY SAND
SB - 47	7	<1	<1	<1	BROWN SANDY CLAY
SB - 48	1	<1	<1	<1	TAN SAND
SB - 48	3	<1	<1	<1	TAN SAND
SB - 48	5	<1	<1	<1	TAN CLAYEY SAND
SB - 48	7	<1	<1	<1	BROWN SANDY CLAY
SB - 49	1	<1	<1	<1	TAN SAND
SB - 49	3	<1	<1	<1	TAN SAND
SB - 49	5	<1	<1	<1	TAN CLAYEY SAND
SB - 49	7	<1	<1	<1	BROWN SANDY CLAY
SB - 50	1	<1	<1	<1	TAN SAND
SB - 50	3	<1	<1	<1	TAN SAND
SB - 50	5	<1	<1	<1	BROWN CLAYEY SAND
SB - 50	7	<1	<1	<1	BROWN SANDY CLAY
SB - 51	1	<1	<1	<1	GREY SAND
SB - 51	3	<1	<1	<1	GREY SAND
SB - 51	5	<1	<1	<1	TAN SAND
SB - 51	7	<1	<1	<1	GREY SAND
SB - 52	1	<1	<1	<1	BROWN SAND
SB - 52	3	<1	<1	<1	GREY SAND
SB - 52	5	<1	<1	<1	GREY SAND
SB - 52	7	<1	<1	<1	GREY SAND

OVA - Organic Vapor Analyzer
BIO - Biogenic Reading
TVH - Total Volatile Hydrocarbons
PPM - Parts Per Million
SB - Soil Boring
INV - Invalid

FIGURES

FLORIDA

MILTON



SITE LOCATION DIAGRAM

SCALE: NTS

DATE: 4/9/96

FIGURE 1

DRAWN BY: JN

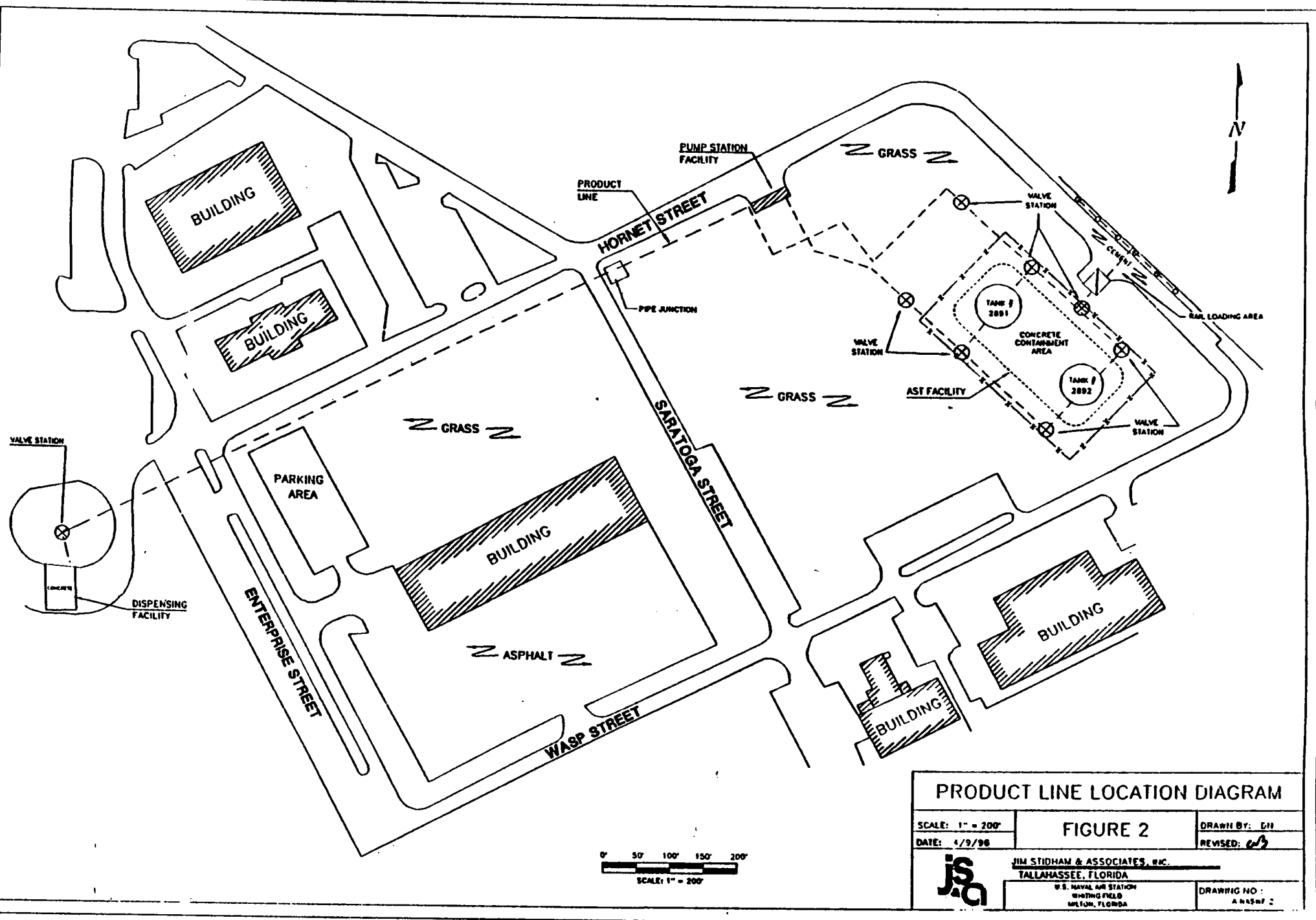
REVISED BY: JN



JIM STIDHAM & ASSOCIATES, INC.
TALLAHASSEE, FLORIDA

WHITING FIELD
MILTON, FLORIDA

DRAWING NO. 00000000



PRODUCT LINE LOCATION DIAGRAM

SCALE: 1" = 200'

DATE: 4/9/96

FIGURE 2

DRAWN BY: EHI

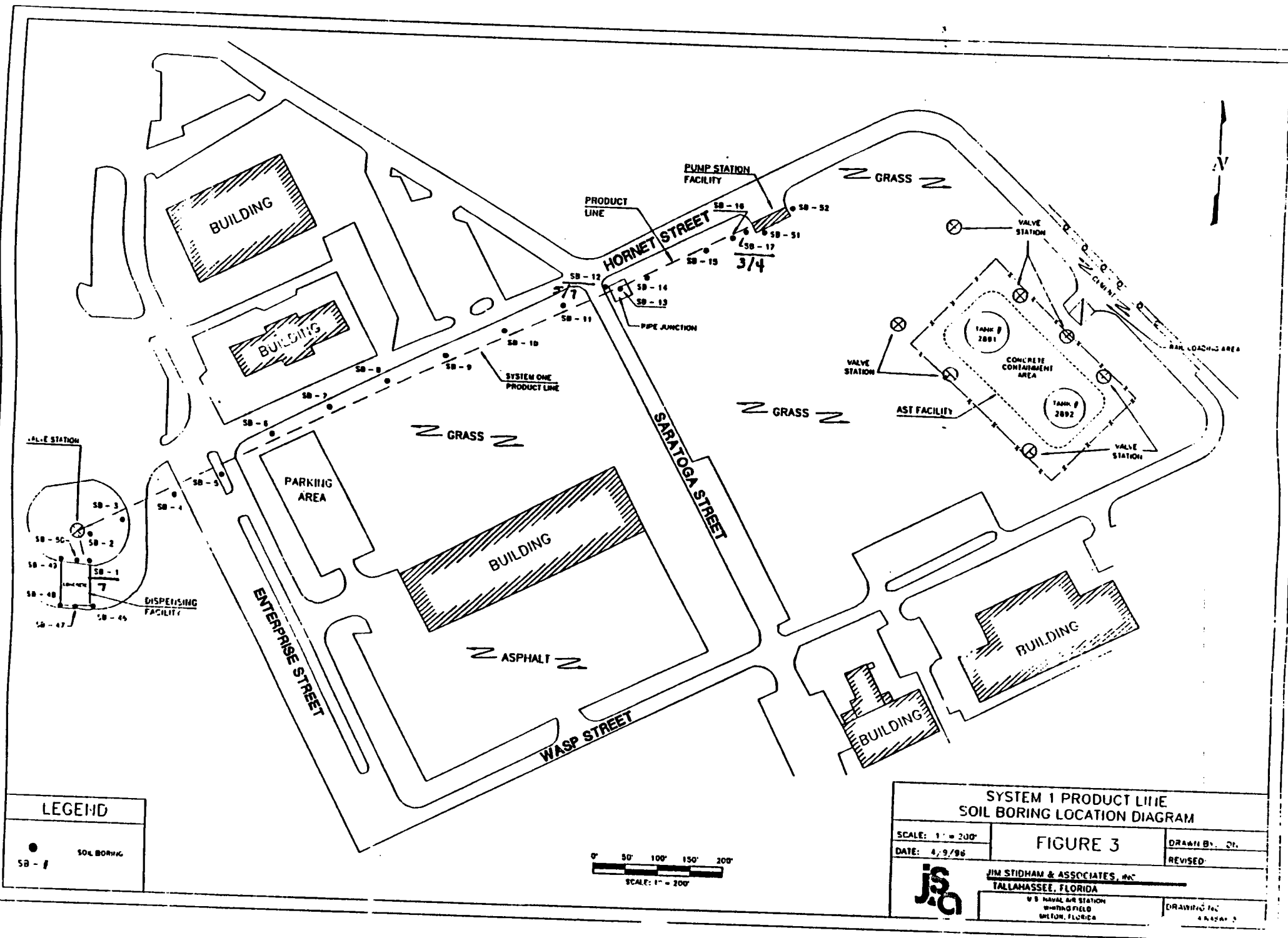
REVISED: *MS*

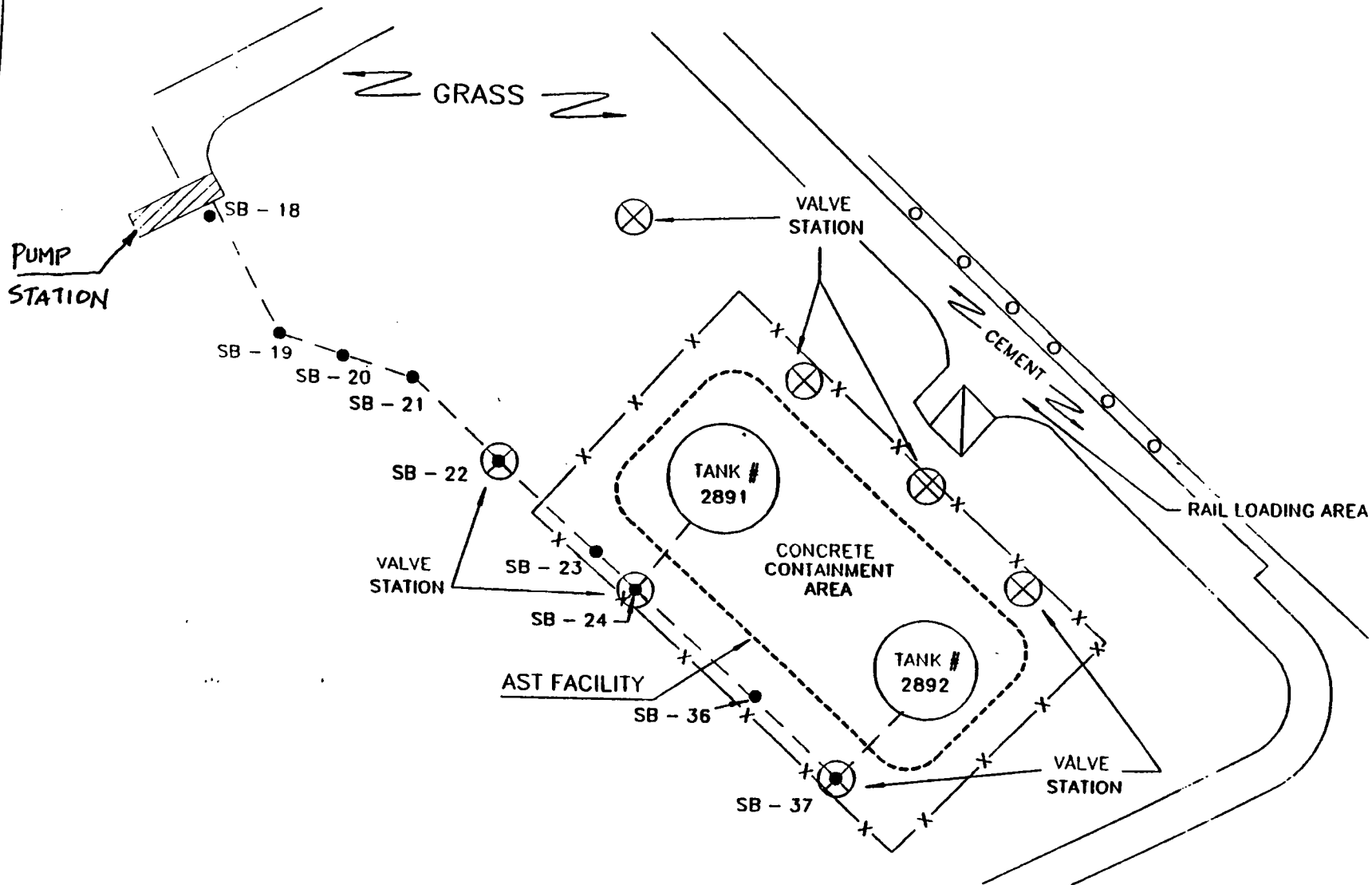


JIM STIDHAM & ASSOCIATES, INC.
TALLAHASSEE, FLORIDA

U.S. NAVAL AIR STATION
WHITING FIELD
MILTON, FLORIDA

DRAWING NO: A-1457-2





LEGEND

● SOIL BORING
SB - #

0' 25' 50' 75' 100'
SCALE: 1" = 100'

SYSTEM 2 PRODUCT LINE SOIL BORING LOCATION DIAGRAM

SCALE: 1" = 100'

DATE: 4/9/98

FIGURE 4

DRAWN BY: E.C.

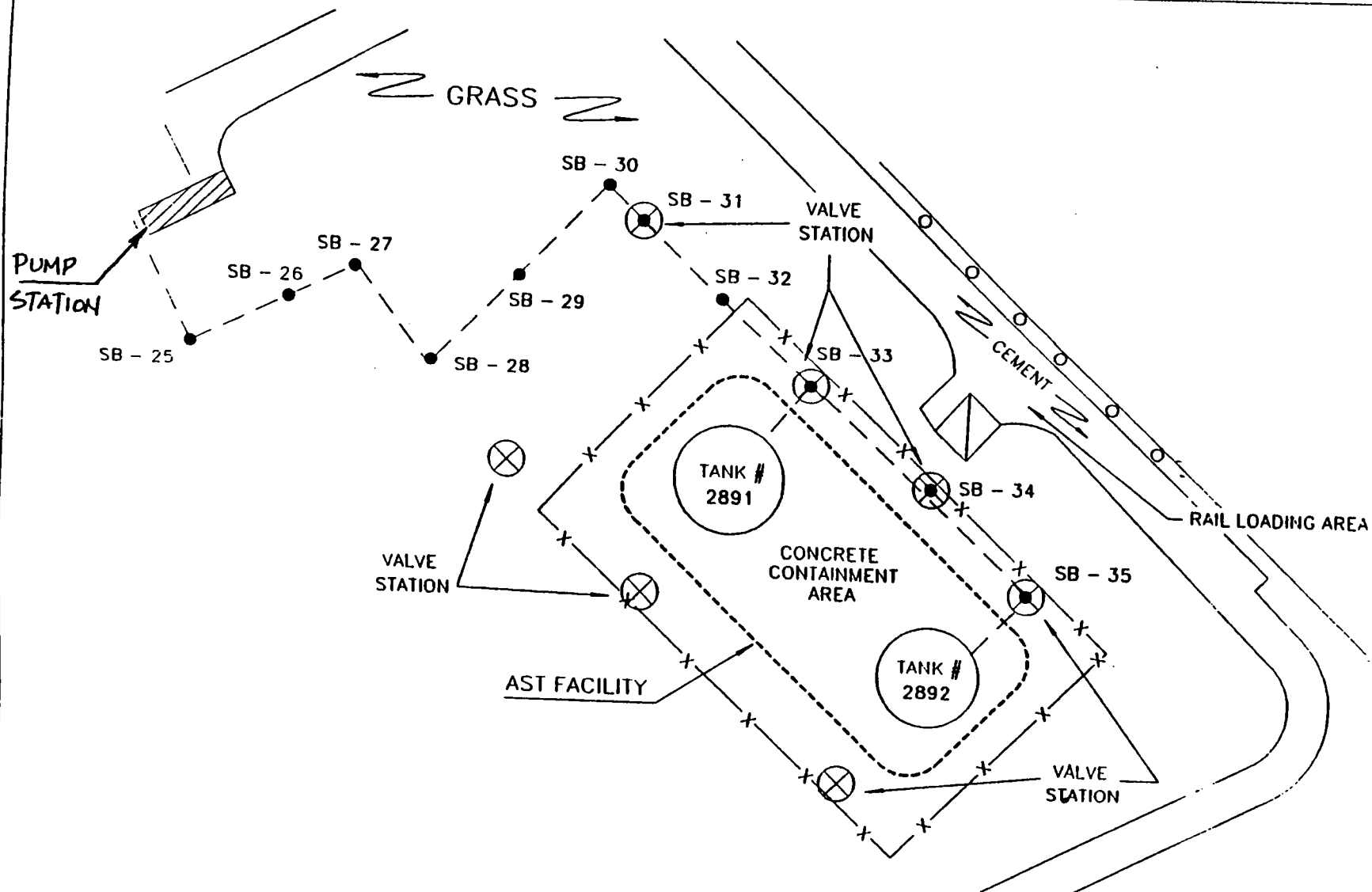
REVISED:



JIM STIDHAM & ASSOCIATES, INC.
TALLAHASSEE, FLORIDA

U.S. NAVAL AIR STATION
WHITING FIELD
MILTON, FLORIDA

DRAWING NO. 4
A NASW 4



LEGEND

● SOIL BORING
SB - /

0' 25' 50' 75' 100'
SCALE: 1" = 100'

SYSTEM 3 PRODUCT LINE SOIL BORING LOCATION DIAGRAM

SCALE: 1" = 100'
DATE: 4/2/96

FIGURE 5

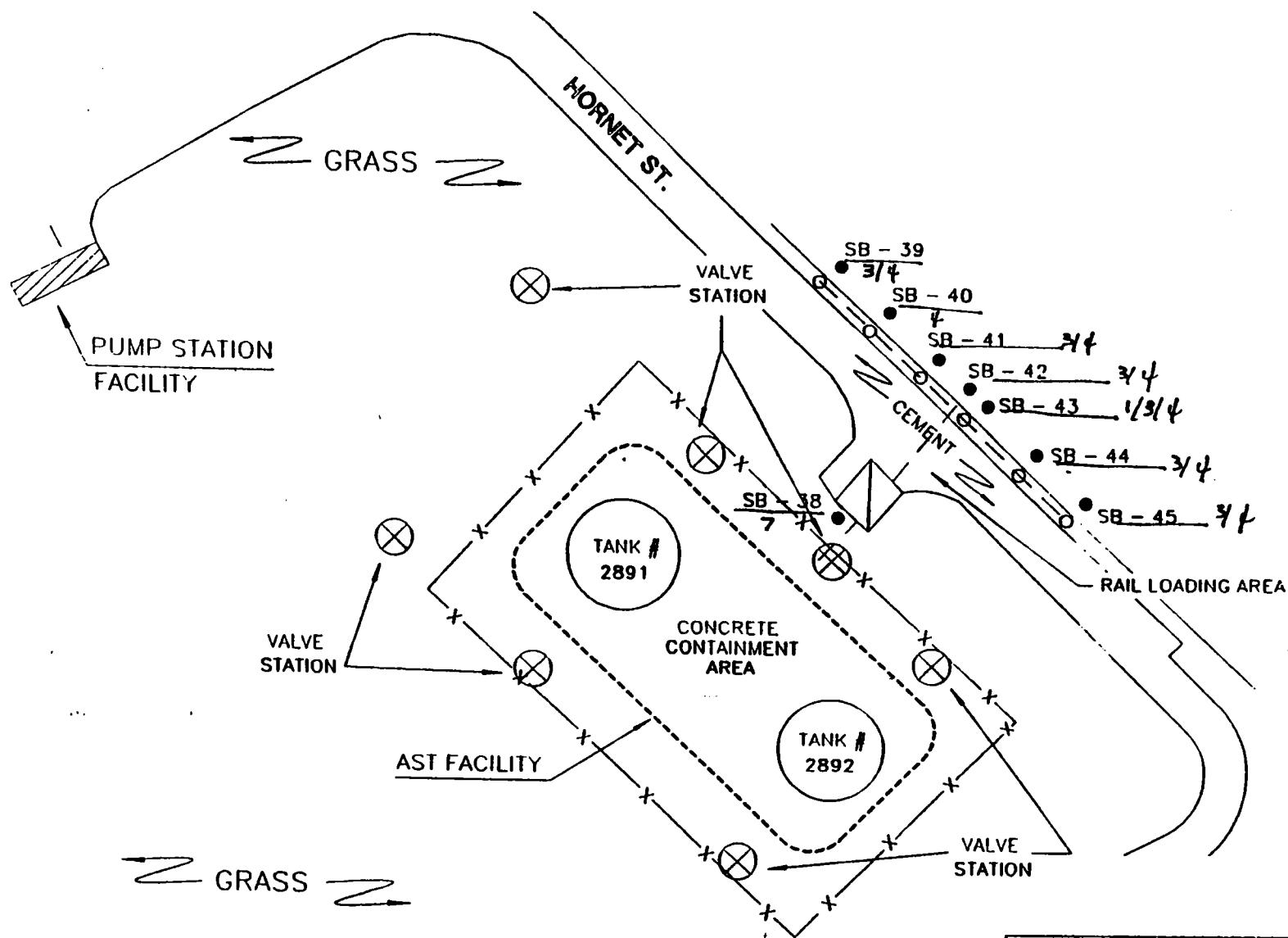
DRAWN BY: Dr.
PEASED



JIM STIDHAM & ASSOCIATES, INC.
TALLAHASSEE, FLORIDA

U.S. NAVAL AIR STATION
WHITES FIELD
MILTON, FLORIDA

DRAWING NO.
A NASAF 5



LEGEND

● SOIL BORING
SB - #

0' 25' 50' 75' 100'
SCALE: 1" = 100'

SYSTEM 4 PRODUCT LINE SOIL BORING LOCATION DIAGRAM

SCALE: 1" = 100'

DATE: 4/9/96

FIGURE 6

DRAWN BY: CH

REVISED

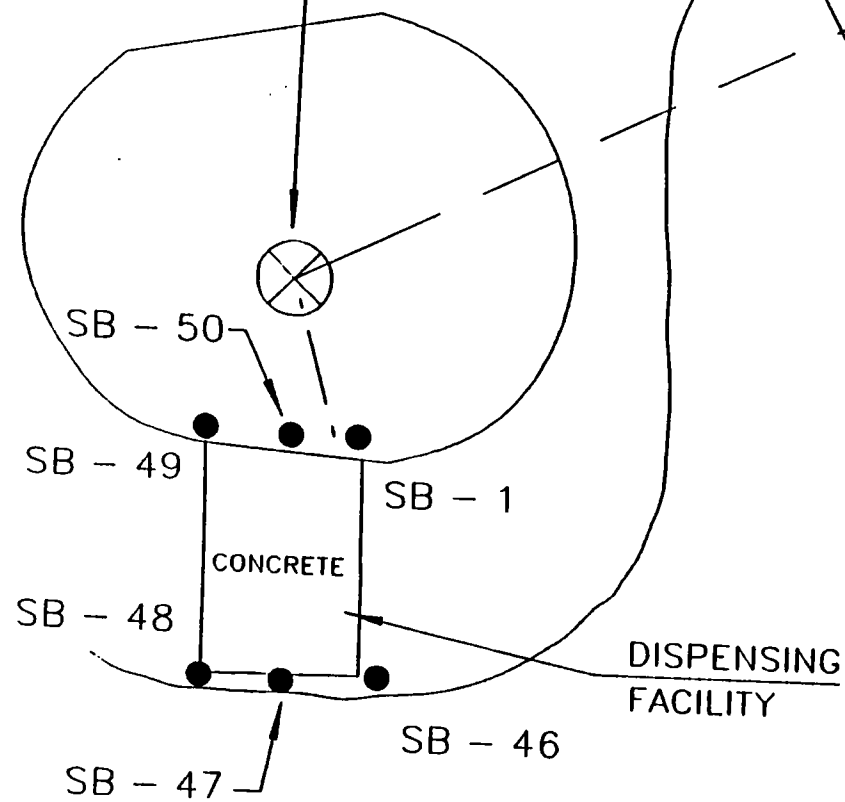


JIM STIDHAM & ASSOCIATES, INC.
TALLAHASSEE, FLORIDA

U.S. NAVAL AIR STATION
WHITING FIELD
MILTON, FLORIDA

DRAWING NO.
A NASAF 6

VALVE STATION



0' 30' 60'
SCALE: 1" = 60'

LEGEND

● SB-# SOIL BORING

DISPENSING AREA SOIL BORING LOCATION DIAGRAM

SCALE: 1" = 60'
DATE: 4/1/96

FIGURE 7

DRAWN BY: Dr.
REVISED:



JIM STIDHAM & ASSOCIATES, INC.
TALLAHASSEE, FLORIDA

U.S. NAVAL AIR STATION
BIRMINGHAM FIELD
MILTON, FLORIDA

DRAWING NO.
ANASAF

APPENDIX A

SAR SUMMARY SHEET

SITE ASSESSMENT REPORT SUMMARY SHEET

Facility Name: NAS Whiting Field, Oil/Water Separator, JP-5 Pipeline Reimbursement Site: ☐

Location: Milton, Florida State Contract Site: ☐

EDI #: _____ FAC I.D.# 578516386 Other: Non-Prog. ☒

Date Reviewed: _____ Local Government: _____

(1) Source of Spill: Unknown Date of Spill: 21 Sep 94

(2) Type of Product: Gasoline Group Gallons Lost Kerosene Group Gallons Lost

<input type="checkbox"/> <u>Leaded</u> <input type="checkbox"/> <u>Unleaded Regular</u> <input type="checkbox"/> <u>Unleaded Premium</u> <input type="checkbox"/> <u>Gasohol</u> <input type="checkbox"/> <u>Undetermined</u>	<input type="checkbox"/> <u>Kerosene</u> <input type="checkbox"/> <u>Diesel</u> <input type="checkbox"/> <u>JP-4 Jet Fuel</u> <input checked="" type="checkbox"/> <u>Jet A Fuel</u> <u>Unknown</u> <input type="checkbox"/> <u>Unknown</u>
---	--

(3) Description of IRA: IRA soil excavation performed during removal of oil/water separator, sludge tankd and UST associated with tank system 2993.

<input type="checkbox"/> Free product Removal: _____ (gals) <input checked="" type="checkbox"/> Soil Removal: <u>34.45</u> (cubic yds) <input type="checkbox"/> Soil Incineration: _____ (cubic yds)	
--	--

(4) Free Product still present (yes/no) No Maximum apparent product thickness: N/A (feet)

(5) Maximum Groundwater contamination levels (ppb):

Total VOA: <u>N/A</u>	benzene: <u>N/A</u>	EDB: <u>N/A</u>
lead: <u>N/A</u>	MTBE: <u>N/A</u>	other: <u>N/A</u>

(6) Brief lithologic description: Light brown to yellowish, fine to med. grained sand w/ some silt from surface to ≈ 3 to 5 ft.

bls. Alternating sandy clay, clay and clayey sand from ≈ 5 to 25 ft. bls. (maximum depth drilled during this investigation).

(7) Areal and vertical extent of soils contamination defined (yes/no) yes

Highest current soil concentration (OVA: >5000 ppm) or (EPA method 5030/8020: 195.6 ppb)

(8) Lower aquifer contaminated? (yes/no) - Depth of vertical contamination: No vertical extent well installed

(9) Date of last complete round of groundwater sampling: N/A Date of last soil sampling: 19 Nov 97

(10) QAPP approved? (yes/no) Date: 6/16/97

(11) Direction (e.g. NNW) of surficial groundwater flow: N/A (Figure _____ on page _____)

(12) Average depth to groundwater: 90 (ft)

(13) Observed range of seasonal groundwater fluctuations: N/A (ft) (Based on water level data collected during the CAR investigation)

(14) Estimated rate of groundwater flow: N/A (ft/day)

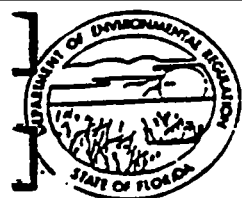
(15) Hydraulic gradient across site: N/A (ft/ft)

(16) Aquifer characteristics:	Values	Units	Method
Hydraulic conductivity	<u>N/A</u>	<u>ft/day</u>	_____
Storage coefficient	<u>N/A</u>	<u>ft/ft</u>	_____
Aquifer thickness	<u>N/A</u>	<u>ft</u>	_____
Effective soil porosity	<u>N/A</u>	<u>%</u>	_____
Transmissivity	<u>N/A</u>	<u>gal/day/ft</u>	_____

(17) Other remarks: No groundwater investigation was performed because excessively contaminated soil is limited to the upper 20 feet of vadose zone and depth to groundwater is approximately 90 feet bls.

APPENDIX B

DISCHARGE NOTIFICATION FORMS



Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

DER Form #	17-761.900(1)
Form Title	Discharge Reporting Form
Effective Date	December 10, 1990
DER Application No.	
(Filed in by DER)	

Discharge Reporting Form

Use this form to notify the Department of Environmental Regulation of.

1. Results of tank tightness testing that exceed allowable tolerances within ten days of receipt of test result.
2. Petroleum discharges exceeding 25 gallons on pervious surfaces as described in Section 17-761.460 F.A.C. within one working day of discovery
3. Hazardous substance (CERCLA regulated), discharges exceeding applicable reportable quantities established in 17-761.460(2) F.A.C., within one working day of the discovery.
4. Within one working day of discovery of suspected releases confirmed by: (a) released regulated substances or pollutants discovered in the surrounding area, (b) unusual and unexplained storage system operating conditions, (c) monitoring results from a leak detection method or from a tank closure assessment that indicate a release may have occurred, or (d) manual tank gauging results for tanks of 550 gallons or less, exceeding ten gallons per weekly test or five gallons averaged over four consecutive weekly tests.

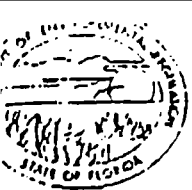
Mail to the DER District Office in your area listed on the reverse side of this form

PLEASE PRINT OR TYPE

Complete all applicable blanks

1. DER Facility ID Number: 57851638C 2. Tank Number: 2993A 3. Date: 9-21-94
4. Facility Name: NAS WHITING FIELD
Facility Owner or Operator: PUBLIC WORKS OFFICER
Facility Address: 7151 USS WASP STREET MILTON, FL 32570-68
Telephone Number: (904) 623-7268 County: SANTA ROSA
Mailing Address: SAME
5. Date of receipt of test results or discovery: 9-21-94 month/day/year
6. Method of initial discovery. (circle one only)
A. Liquid detector (automatic or manual) D. Emptying and Inspection. F. Vapor or visible signs of a discharge in the vicinity.
B. Vapor detector (automatic or manual) E. Inventory control. G. Closure: _____ (explain)
C. Tightness test (underground tanks only). H. Other: PRODUCT IN MONITOR WELL
(PRODUCT WAS REMOVED FROM TANK TAKEN OUT OF SERVICE)
7. Estimated number of gallons discharged: UNKNOWN
8. What part of storage system has leaked? (circle all that apply) A. Dispenser B. Pipe C. Fitting D. Tank E. Unknown
9. Type of regulated substance discharged. (circle one)
A. leaded gasoline D. vehicular diesel L. used/waste oil V. hazardous substance includes pesticides, ammonia, chlorine and derivatives (write in name or Chemical Abstract Service CAS number) _____
B. unleaded gasoline F. aviation gas M. diesel Z. other (write in name) _____
C. gasohol G. jet fuel O. new/lube oil
10. Cause of leak. (circle all that apply)
A. Unknown C. Loose connection E. Puncture G. Spill _____ I. Other (specify) _____
B. Split D. Corrosion F. Installation failure H. Overfill _____
11. Type of financial responsibility. (circle one)
A. Third party insurance provided by the state insurance contractor C. Not applicable
B. Self-insurance pursuant to Chapter 17-769.500 F.A.C. D. None

To the best of my knowledge and belief all information submitted on this form is true, accurate, and complete.



Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

2993 Closure Assessment

DER Form #	17-781.900(1)
Form Title	Discharge Reporting Form
Effective Date	December 10, 1990
DER Application File	(Filed in by DER)

Discharge Reporting Form

Use this form to notify the Department of Environmental Regulation of:

- Results of tank tightness testing that exceed allowable tolerances within ten days of receipt of test result.
- Petroleum discharges exceeding 25 gallons on pervious surfaces as described in Section 17-781.460 F.A.C. within one working day of discovery.
- Hazardous substance (CERCLA regulated), discharges exceeding applicable reportable quantities established in 17-781.460(2) F.A.C., within one working day of the discovery.
- Within one working day of discovery of suspected releases confirmed by: (a) released regulated substances or pollutants discovered in the surrounding area, (b) unusual and unexplained storage system operating conditions, (c) monitoring results from a leak detection method or from a tank closure assessment that indicate a release may have occurred, or (d) manual tank gauging results for tanks of 550 gallons or less, exceeding ten gallons per weekly test or five gallons averaged over four consecutive weekly tests.

Mail to the DER District Office in your area listed on the reverse side of this form

PLEASE PRINT OR TYPE
Complete all applicable blanks

- DER Facility ID Number: _____
- Tank Number: _____
- Date: 01/31/97
- Facility Name: BLDG 2993
Facility Owner or Operator: BULK FUELING
Facility Address: WASP RD
Telephone Number: (904) 623-7246 County: SANTA ROSA
Mailing Address: PO BOX 7183 Langley ST, NAS Whiting Field, MILTON FL 320
- Date of receipt of test results or discovery: 01/17/97 (Previously 09/95 by G. Swan) month/day/year
- Method of initial discovery. (circle one only)
A. Liquid detector (automatic or manual) D. Emptying and inspection. F. Vapor or visible signs of a discharge in the vicinity
B. Vapor detector (automatic or manual) E. Inventory control. G. Closure: (explain)
C. Tightness test (underground tanks only). H. Other: Contamination Assessment Report by G. Swan 09/1995
- Estimated number of gallons discharged: UNKNOWN
- What part of storage system has leaked? (circle all that apply) A. Dispenser B. Pipe C. Fitting D. Tank E. Unknown
- Type of regulated substance discharged. (circle one)
A. leaded gasoline D. vehicular diesel L. used/waste oil V. hazardous substance includes pesticides, ammonia, chlorine and derivatives (write in name or Chemical Abstract Service CAS number) _____
B. unleaded gasoline F. aviation gas M. diesel Z. other (write in name) _____
C. gasohol G. jet fuel O. new/lube oil
- Cause of leak. (circle all that apply)
A. Unknown C. Loose connection E. Puncture G. Spill I. Other (specify) _____
B. Spill D. Corrosion F. Installation failure H. Overfill _____
- Type of financial responsibility. (circle one)
A. Third party insurance provided by the state insurance contractor (C.) Not applicable
B. Self-insurance pursuant to Chapter 17-789.500 F.A.C. D. None
- To the best of my knowledge and belief all information submitted on this form is true, accurate, and complete.

LESLIE J NICHOLS

Printed Name of Owner, Operator or Authorized Representative

Signature of Owner, Operator or Authorized Representative

Northwest District
100 Government Center
Tallahassee, Florida 32301-3794
904 438 8330

Northwest District
7825 Baymeadows Way, Suite B 220
Jacksonville, Florida 32207
904 798 4200

Central District
3219 Macaulay Bl. S. Suite 232
Orlando, Florida 32812-3767
407 884 7333

Southwest District
4870 Oak Park Blvd.
Tampa, Florida 33610-7347
813 423 3581

South District
2709 Bay St.
Fort Myers, Florida 33901-7808
813 332 8978

Southeast District
1802 S. Congress Ave. Suite A
West Palm Beach, Florida 33408
407 833 2070

APPENDIX C

CLOSURE REPORT AND IRA REPORT FOR OIL/WATER SEPARATOR

Underground Storage Tank Installation and Removal Form For Certified Contractors

Pollutant Storage System Specialty Contractors as defined in Section 409.113, Florida Statutes (Certified contractors as defined in Section 17-761.200, Florida Administrative Code) shall use this form to certify that the installation, replacement or removal of the storage tank system(s) located at the address listed below was performed in accordance with Department Reference Standards.

General Facility Information

- DER Facility Identification No.: _____
- Facility Name: 2993 BULK FUELING Telephone: (____) _____
- Street Address (physical location): WASP STREET
- Owner Name: UNITED STATE NAVY R.O.I.C.C Telephone: (____) _____
- Owner Address: BLDG 1416 7183 LANGLEY ST NAS WHITING FIELD MILTON FL 32570
- Number of Tanks: a. Installed at this time _____ b. Removed at this time 2
- Tank(s) Manufactured by: UNKNOWN
- Date Work Initiated: DECEMBER 10, 1996 9. Date Work Completed: DECEMBER 11, 1996

Underground Pollutant Tank Installation Checklist

Please certify the completion of the following installation requirements by placing an (X) in the appropriate box.

- The tanks and piping are corrosion resistant and approved for use by State and Federal Laws. ☐
- Excavation, backfill and compaction completed in accordance with NFPA (National Fire Protection Association) 30(87), API (American Petroleum Institute) 1615, PEI (Petroleum Equipment Institute) RP100-87 and the manufacturers' specifications. ☐
- Tanks and piping pretested and installed in accordance with NFPA 30(87), API 1615, PEI/RP100(87) and the manufacturers' specifications. ☐
- Steel tanks and piping are cathodically protected in accordance with NFPA 30(87), API 1632, UL (Underwriters Laboratory) 1746, S11 (Steel Tank Institute) R892-89 and the manufacturer's specifications. ☐
- Tanks and piping tested for tightness after installation in accordance with NFPA 30(87) and PEI/RP100-87. ☐
- Monitoring well(s) or other leak detection devices installed and tested in accordance with Section 17-761.640, Florida Administrative Code (F.A.C.) ☐
- Spill and overfill protection devices installed in accordance with Section 17-761.500, F.A.C. ☐
- Secondary containment installed for tanks and piping as applicable in accordance with Section 17-761.500, F.A.C. ☐

Please Note: The numbers following the abbreviations (e.g. API 1615) are publication or specification numbers issued by these institutions.

Underground Pollutant Tank Removal Checklist

Closure assessment performed in accordance with Section 17-761.800, F.A.C.

- Underground tank removed and disposed of as specified in API 1604 in accordance with Section 17-761.800, F.A.C.

DER Form	17-761.800(5)
Form Title	Underground Storage Tank Installation & Removal Form for Certified Contractors
Effective Date	December 10, 1990
DER Application No.	(filled in by DER)

Certification

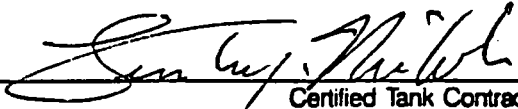
I hereby certify and attest that I am familiar with the facility that is registered with the Florida Department of Environmental Regulation; that to the best of my knowledge and belief, the tank installation, replacement or removal at this facility was conducted in accordance with Chapter 489 and Section 376.303, Florida Statutes and Chapter 17-761, Florida Administrative Code (and its adopted reference sources from publications and standards of the National Fire Protection Association (NFPA), the American Petroleum Institute (API), the National Association of Corrosion Engineers (NACE), American Society for Testing and Materials (ASTM); Petroleum Equipment Institute (PEI); Steel Tank Institute (STI); Underwriters Laboratory (UL); and the tank and integral piping manufacturers' specifications; and that the operations on the checklist were performed accordingly.

LESLIE J. NICHOLS

(Type or Print)

Certified Pollutant Tank Contractor Name

Pollutant Storage System Specialty Contractor License Number (PSSSC)



Certified Tank Contractor Signature

PC-C055743

PSSSC Number

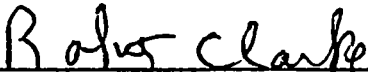
1-14-97

Date

ROBERT CLARKE

(Type or Print)

Field Supervisor Name



Field Supervisor Signature

1-14-97

Date

1-14-97

Date

The owner or operator of the facility must register the tanks with the Department at least 10 days before the installation. The installer must submit this form no more than 30 days after the completion of installation to the Department of Environmental Regulation at the address printed at the top page one.



DER Form #	17-701.0000
Form Title	Closure Assessment Form
Effective Date	December 10, 1990
DER Application No.	(Filled in by DER)

Closure Assessment Form

Owners of storage tank systems that are replacing, removing or closing in place storage tanks shall use this form to demonstrate that a storage system closure assessment was performed in accordance with Rule 17-761 or 17-762, Florida Administrative Code. Eligible Early Detection Incentive (EDI) and Reimbursement Program sites do not have to perform a closure assessment.

Please Print or Type
Complete All Applicable Blanks

- Date: 1-14-97
- DER Facility ID Number: _____
- County: SANTA ROSA
- Facility Name: BLDG 2993
- Facility Owner: BULK FUELING
- Facility Address: WASP RD
- Mailing Address: BOICC, NAS WHITING FIELD, 7183 LANGLEY ST, MILTON FL 32570
- Telephone Number: (904) 623-7246
- Facility Operator: BULK FUELING
- Are the Storage Tank(s): (Circle one or both) A. Aboveground or (B) Underground
- Type of Product(s) Stored: FUEL JP-5
- Are the Tank(s): (Circle one) A. Replaced (B.) Removed C. Closed In Place D. Upgraded (aboveground tanks only)
- Number of Tanks Closed: 1
- Age of Tanks: UNKNOWN

Facility Assessment Information

Yes No Not Applicable

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☒

- Is the facility participating in the Florida Petroleum Liability Insurance and Restoration Program (FPLIRP)?
- Was a Discharge Reporting Form submitted to the Department?
If yes, When: _____ Where: _____
- Is the depth to ground water less than 20 feet?
- Are monitoring wells present around the storage system?
If yes, specify type: ☐ Water monitoring ☐ Vapor monitoring
- Is there free product present in the monitoring wells or within the excavation?
- Were the petroleum hydrocarbon vapor levels in the soils greater than 500 parts per million for gasoline?
Specify sample type: ☐ Vapor Monitoring wells ☐ Soil sample(s)
- Were the petroleum hydrocarbon vapor levels in the soils greater than 50 parts per million for diesel/kerosene?
Specify sample type: ☐ Vapor Monitoring wells ☐ Soil sample(s)
- Were the analytical laboratory results of the ground water sample(s) greater than the allowable state target levels?
(See target levels on reverse side of this form and supply laboratory data sheets)
- If a used oil storage system, did a visual inspection detect any discolored soil indicating a release?
- Are any potable wells located within 1/4 of a mile radius of the facility?
- Is there a surface water body within 1/4 mile radius of the site? If yes, indicate distance: _____

Date: 1-14-97

CLOSURE ASSESSMENT REVIEW CHECKLIST

Facility Name: BLDG 2993 Facility #

Facility Owner or Operator: BULK FUELING

Facility Address: WASP RD Phone

Mailing Address:

es No N/A
Unk

X

Is this an EDI/PLIRP/ATRP site? (circle one)

Have the following forms been received?:

—

—

Storage Tank Registration/Notification Form

—

—

Discharge Notification/Reporting Form?

—

—

Closure Assessment Form?

—

—

Was an OVA used on site? FID/PID (circle one)
(w/carbon filter?)

—

—

Were any OVA readings greater than 50 ppm or 500 ppm? (circle one
that applies)

X

—

Was there visual evidence of contamination/discharge? (i.e. soil staining,
sheen, tank holes, etc.)

—

—

Was excessively contaminated soil removed? If so, how much? _____
(IRA information received)

—

—

Were manifests for soil, water, sludge &/or tanks received?

—

—

Is the depth to groundwater given? If so what _____.

—

—

Was groundwater analysis done? 601 602 610 418.1 (circle test(s)
done)

—

—

Were any results greater than SRLs? If so which?

Have the following been received?

—

—

All lab analyses?

—

—

All OVA readings?

—

—

Lab quality assurance and control statement or #?

—

—

Field quality assurance and control statement?

Site map indicating location of:

—

—

storage tank system?

X

—

dispensers?

—

—

monitoring wells?

—

—

buildings/roads?

X

—

storm drains?

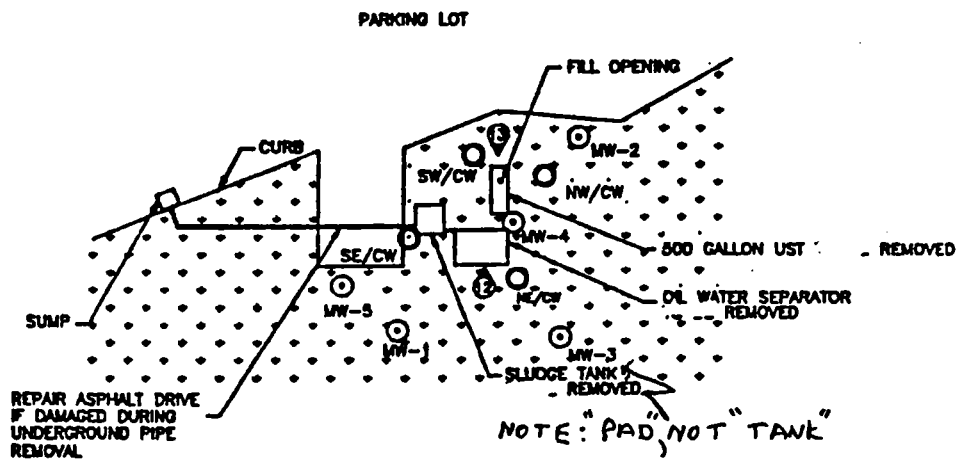
—

—

(sampling? soil) & groundwater (circle)

BUILDING 2993

NOT TO SCALE



LEGEND	
	GRASS
	PHOTO NUMBER/DIRECTION
	MONITORING WELL (MW)
	COMPLIANCE WELLS (CW)
	(SE = SOUTHEAST)
	(SW = SOUTHWEST)
	(NE = NORTHEAST)
	(NW = NORTHWEST)
BY REMOVED	

PETROLEUM CONTAMINATION
INITIAL REMEDIAL ACTION NOTIFICATION FORM

This notification provides written confirmation of initial remedial action (IRA) as required by Chapter 17-770.300(5) and (8), Florida Administrative Code. Notification must be within three working days of initiation of an IRA. Upon completion of the IRA, an Initial Remedial Action Report should be submitted.

I. Facility Name: BUILDING 2993
Facility Address: WHITINGFIELD NAVAL AIR STATION MILTON, FL
DER Facility Number (if applicable): _____
Date of Initiation of IRA: 01/12/1997

II. FREE PRODUCT RECOVERY (Please provide brief responses.) NONE

- A. Type of Product Discharged: _____
B. Estimated Quantity Lost: _____ gallons
C. Product Thickness in Wells, Boreholes, Excavations, or Utility Conduits (Attach Site Plan indicating locations and depths): _____
D. Method of Product Recovery: _____
E. Type of Discharge During Product Recovery: _____
F. Type of Treatment and Expected Effluent Quality from Any Discharge: Treatment
G. Quantity and Disposal of Recovered Product: _____

III. SOIL EXCAVATION

- A. Estimated Volume of Contaminated Soil Excavated (Attach Site Plan indicating location of excavation(s) and soil borings): 34.45 cubic yards (in place) (See Closure Report For sketch)

- B. Type of Product in Soil: J P 5
- C. Method Used to Determine Excess Soil Contamination: OVA
- D. Method of Treatment or Disposal of Contaminated Soil: LANDFILL

IV. REPORTING

This notification should be submitted to the appropriate Local Program, if any, or to:

Florida Department of Environmental Regulation
Bureau of Waste Cleanup
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

[Signature]
Person Completing Form

President
Title, Affiliation

[Signature] 2-11-97
Signature, Date

PETROLEUM CONTAMINATION
INITIAL REMEDIAL ACTION REPORT FORM

An Initial Remedial Action report, summarizing the initial remedial action (IRA), should be prepared to satisfy the requirements of Chapters 17-770.630(1)14; 17-773.500(1)(a)4; and 17-773.500(2)(a)4, Florida Administrative Code, (FAC). This form may be used for the IRA report. The report should be sent to the appropriate local program and:

Florida Department of Environmental Regulation
Bureau of Waste Cleanup
Engineering Support Section
2600 Blair Stone Road
Tallahassee, FL 32399-2400

- I. FACILITY NAME: BUILDING #. 2993
Facility Address: WASP Bldg, NAS WHITING FIELD, MILTON FL
DER Facility Number (if applicable): _____
Date IRA Initiated: 12/26/1996 Date IRA Completed: 01/17/1997
- II. FREE PRODUCT RECOVERY NONE
- A. Type(s) of Product Discharged: _____
- B. Quantity
1. Estimated Gallons Lost: _____
 2. Gallons Recovered: _____ through _____ (date)
 3. Attach Exhibit Indicating Amount of Product Recovered, Dates and Cumulative Totals.
- C. Attach a Scaled Site Plan, Indicating the Locations and Product Thickness in Wells, Boreholes, Excavations, or Utility Conduits and Wells Utilized for Recovery of Free Product.
- D. Method of Product Recovery: _____

- E. Type of Discharge During Product Recovery: _____

F. Type of Treatment, i.e., Oil/Water Separator:

G. Attach Written Proof of Proper Disposal of Recovered Product:

III. SOIL EXCAVATION

NOTE: Soil shall be defined as excessively contaminated using the procedure stated in Chapter 17-770.200(2), FAC. Representative soil sampling shall be performed as close to the time of excavation as possible, but at no time shall exceed three (3) months prior to the start of excavation. Stockpiled soils greater than thirty (30) days on site waiting for treatment and disposal, must be re-sampled immediately prior to disposal to assure soils are still excessively contaminated.

If soil sampling data indicates that the amount of soil that is excessively contaminated exceeds 1500 cubic yards, treatment of all excessively contaminated soil at the site shall be addressed in a remedial action plan, and no soil IRA activities shall be performed except for the removal of soils in the immediate vicinity of the tanks.

Only soil above the ambient water table at the time of excavation can be considered as excessively contaminated soil.

Unless the established weight per unit volume of 1.4 tons/cubic yard (as referenced in FAC Rule 17-775) is used for the excavated soil, the weight per unit volume must be determined by a field test (in which an accurately measured volume of soil is weighed) at the time of excavation.

A. Volume of Contaminated Soil Excavated in Cubic Yards:

34.45. Dimensions Including Depth of Excavation(s):
10 FT by 15.5 FT by 6 FT in DEPTH

NOTE: Attach written proof from the Department in the form of an Alternate Procedure Approval Order authorizing excavating over 1500 cubic yards if applicable. Authorization must be prior to the excavation of soils.

B. Type(s) of Product in Soil: HYDROCARBON (JP 5)

01-20-91 13:54 28904 283 7100 PHONE NO. : 9549730310

Jan. 20 1997 02:37PM P2

Waste Management Inc. - Florida
Industrial Waste Service Center
4011 W. 45th Street
Miramar Beach, FL 33573



A Waste Management Company

NON- HAZARDOUS MANIFEST

SC No 6653

WASTE MANAGEMENT TRANSPORTATION

Generator NAVAL AIR STATION - WILMINGTON FIELD
Address Bldg. 2993 (BULK FUELING)
RAVINE ST MILTON FL 32570
City RAVINE 1644 P.O.
Generator Signature [Signature]

Driver Name (Print) Lloyd K. Madden
Truck Number #104
I hereby acknowledge that the above-described materials were received from the generator site were transported without incident to the destination listed below.
[Signature] 1-17-97
Driver Signature Delivery Date

Description of Waste Materials	Profile Number	Account #	Total Quantity	Weight
[Redacted]	[Redacted]	[Redacted]	[Redacted]	
[Redacted]				

Receiver Name SPRINGHILL REGIONAL LANDFILL
Address 4945 Hwy 273, GRACEVILLE FL
Phone Number (904) 263-7100

Receiver acknowledges receipt of the above-described materials.

[Signature] 1/17/97
Name of Authorized (Print) Signature Receipt Date

WHITE - GENERATOR YELLOW - LANDFILL PINK - LANDFILL GOLD - TRANSPORTER

Fax - Copy TO 1-904-623-7515

01 : 1111 - 1150

01/20/91

13:54

2804 263 7100

PHONE NO. : 9549730310

Jan. 20 1997 02:37PM F3
1000

Waste Management Inc. - Florida
Industrial Waste Service Center
2900 N.W. 48th Street
Pompano Beach, FL 33373



A Waste Management Company

NON-HAZARDOUS MANIFEST

SC No 6654

Generators NAVAL AIR STATION - WILMINGTON
Address Bldg 2998 (BUNK FUELING)
LAUREY ST, WILMINGTON, FL 32570
(904) 678-1644 P.O.
Generators Signature R E Stiles

Driver Name (Print) Earl C. Clavers
Truck Number 101
I hereby acknowledge that the above-described materials
were received from the generator site were transported
without incident to the destination listed below.
Earl C. Clavers 1-17-97
Driver Signature Delivery Date

Description of Waste Materials	Profile Number	Account #	Total Quantity	Weight
<u>PETROLEUM CONTAMINATED SOIL</u>	<u>469309</u>	<u>0005763</u>	<u>16.98</u>	

Site Name SPRINGHILL REGIONAL LANDFILL
Address 4945 Hwy 273, GRADSVILLE, FL
Phone Number (904) 263-7100

I hereby acknowledge receipt of the above-described materials.
C. Moss
Name of Authorized (Print)

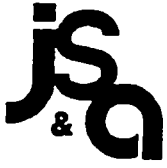
C. Moss 1/17/97
Signature Receipt Date

WHITE - GENERATOR YELLOW - LANDFILL PINK - LANDFILL GOLD - TRANSPORTER

Fax Copy TO 11-904-623-7515

APPENDIX D

CLOSURE REPORT FOR PRODUCT LINE



JIM STIDHAM & ASSOCIATES, INC.

547 N. MONROE ST., SUITE 201 - POST OFFICE BOX 3547 - TALLAHASSEE, FLORIDA 32303-3547
TELEPHONE: 904/222-3975 FAX: 904/681-0560

**PRODUCT LINE CLOSURE
ASSESSMENT REPORT**

**UNITED STATES NAVAL AIR STATION
WHITING FIELD
MILTON, FLORIDA 32570**

FDEP FACILITY I.D. #578516386

APRIL 12, 1996

PREPARED FOR:

**SANTA ROSA COUNTY STORAGE TANK PROGRAM
ESCAMBLA COUNTY PUBLIC HEALTH UNIT
1190 WEST LEONARD STREET, SUITE 2
PENSACOLA, FLORIDA 32501**

PREPARED BY:

JIM STIDHAM & ASSOCIATES, INC.

**CLOSURE ASSESSMENT REPORT
UNITED STATES NAVAL AIR STATION
WHITING FIELD
FACILITY ID # 578516386**

INTRODUCTION

On March 27, 1996 Jim Stidham & Associates, Inc. (JSA) began performance of closure assessment activities on a system of product lines that were once affiliated with two above ground storage tanks (ASTs) that are identified as Tank #2891 and Tank #2892. This AST facility and the associated product line system are located on the south side of Hornet Street, United States Naval Air Station, Whiting Field, Milton, Florida 32570 (Figure 1). The product line system extends from the northwest area of the AST facility that contains Tank #2891 and Tank #2892 to a pump station facility located on Hornet Street. The product line system then proceeds in a southwesterly direction along Hornet Street under Saratoga Street to a dispensing facility. The product line system was taken out of service and closed in place by Environmental Recovery, Inc. (ERI) and Minority Speciality Contractors Inc. (MSC).

JSA arrived on the site on March 27, 1996 and met with Eric Taylor of Minority Speciality Contractors to discuss the product line closure assessment at the above referenced facility. The product lines are constructed of metal and are located approximately three feet below land surfaces (BLS) in most areas. The product line system included in this closure assessment consists of two separate lines from the AST facility to the pump station building located along Hornet Street with a single 10-inch product line extending from this pump station facility to a product dispensing area. There is also a 4-inch product line connecting the two ASTs to a former dispensing area approximately 110 feet to the northeast of the AST facility. Figure 2 displays the product lines included in this closure assessment. Each of the two product lines that extend from the ASTs to the pump station line connects to both ASTs and contain valve stations at various locations between the ASTs and the pump station facility. One 8-inch product line services the northeast side of the AST facility and travels in a northwesterly direction to the southwest side of the pump station facility. A second 10-inch product line services the southwest side of the AST facility and extends from the AST in a northwesterly direction and connects to the southeast portion of the pump station facility. A 10-inch line extends in a southwesterly direction along Hornet Street from the pump station to a former dispensing facility located southwest of the junction of Hornet and Enterprise Streets. The following

information summarizes the activities that occurred at this facility as a part of this Product Line Closure Assessment Report.

SITE HISTORY

There is a total of four product line systems associated with the AST system at the above mentioned facility. The product lines at this facility were taken out of service through in-place closure by Environmental Recovery, Inc. (ERI) from February 26, 1996 to February 29, 1996. The product lines involved in this product line closure assessment were affiliated with two 231,000 gallon ASTs that contain Jet Petroleum #5 (JP-5).

PRODUCT LINE ASSESSMENT (PLCA)

Beginning on March 26, 1995 and concluding on March 29, 1996, JSA performed the product line closure assessment for these four product line systems that were affiliated with the two ASTs (Tank #2891 and Tank #2892). The two ASTs at this facility remain in service (Figure 2).

Soil samples were collected for organic volatile analysis (OVA) at the beginning and the end of each product line and also on a 100-foot interval basis along each product line. Additional soil samples were collected in the areas where product line direction changes occur and also in the areas of valve stations located along the product lines associated with this closure assessment. Soil samples were also collected in the vicinity of both the former rail loading area and the former dispensing area. For the purposes of this product line closure assessment report, the four product lines in question will be identified as System 1, System 2, System 3, and System 4. System 1 is identified as the product line extending from the dispensing area to the pump station facility. System 2 is identified as the product line that extends from the southeast side of the pump station facility to the southwest side of the AST facility. The product line that extends from the southwest area of the pump station facility to the northeast portion of the AST facility is identified as System 3. System 4 consists of the 4-inch product line that extends from the northeast area of the AST facility to a former rail loading area located approximately 110 feet to the northeast.

System 1 consists of approximately 1315 feet of 10 inch metal product lines. This product line maintains a consistent below gradient depth of approximately 3 feet except for an aboveground junction located near Soil Boring #13 (SB-13) and an exposed portion near the pump station facility.

A total of 17 soil borings was installed along this product line, beginning with SB-1 located near the dispensing facility and ending with SB-17 near the pump station facility. SB-2 was installed near a valve station that is located on a 45-degree direction change in the product line. All other soil borings are located on a 100-foot interval basis (or less depending upon obstructions such as roads and parking lots). Elevated OVA values were encountered in soil collected from SB-1, SB-12, and SB-17. Soil samples collected from the remaining soil borings indicated OVA readings below detection limits. Two additional soil borings were also installed around the pump station facility. These soil borings were installed to a depth of 7 feet BLS and revealed OVA readings below detection limits. Figure 3 displays the location of the soil borings along the product line located within System 1.

The second system, System 2, consists of approximately 605 feet of 10 inch metal product lines. With the exception of an exposed area near the pump station facility, this product line is approximately 3 feet below land surface (BLS) throughout its extent. Soil borings SB-18 through SB-24 and SB-36 and SB-37 were installed along the product line on a 100-foot interval basis to include product line direction changes and valve stations. SB-18 was installed on one end of the product line near the pump station facility and SB-37 was installed at the opposite end near the AST area. All soil borings, with the exception of SB-18, were installed to a depth of 7 feet BLS for collection of soil for OVA analysis. SB-18 was installed to a depth of only four feet BLS since the product line is exposed above land surface in this area. All soil samples collected from these soil borings revealed OVA values below detection limits. Figure 4 displays the location of these soil borings along the product line designated as System 2.

System 3 contains approximately 795 feet of 8 inch metal product lines. The majority of this product line is approximately 3 feet BLS except for the portion of the product line located within the AST facility. The depth of the product line within the AST facility is approximately 8 feet BLS. A total of eleven soil borings were installed along this product line system, beginning with SB-25 near the pump station facility and ending with SB-35 in the area of the AST facility. In the area where this product line is located approximately 3 feet BLS, soil borings SB-25 through SB-32 were installed to a depth of 7 feet BLS. Within the area of the AST facility where this product line is located approximately 8 feet BLS, soil borings SB-33, SB-34, and SB-35 were installed to a depth of 12 feet BLS. These three soil borings were installed in the immediate vicinity of valve stations. All of the soil borings along System 3 were installed on a 100-foot interval basis and included all product line direction changes and valve stations. All soil samples collected for OVA analysis along this product line contained values below detection limits. The locations of these soil borings are displayed in Figure 5.

The product line contained within System 4 consists of metal 4 inch piping that extends from the northeast portion of the AST facility to a former rail loading area located approximately 110 feet to the northeast side of the AST facility. At one time, this AST facility was supplied with JP-5 products by way of rail transport. The product line designated as System 4 once served as an off loading area for the JP-5 fuel transported to the AST facility by rail. This system contains six off loading junctions, all of which combine into one 4-inch product line that was once connected to the AST facility. A total of seven soil borings (SB-39 through SB-45) were installed in the rail loading area of this product line with one soil boring adjacent to each rail loading junction and one soil boring in the area where this product line changes direction to travel to the AST facility. An additional soil boring (SB-38) was also placed between the rail loading area and the AST facility. Soil samples collected for OVA analysis from SB-39 through SB-45 revealed excessive levels of petroleum contamination from soil collected at depths of three and four feet BLS. Soil collected for analysis from SB-38 revealed excessive levels of petroleum contamination from soil collected at a depth of 7 feet BLS. Figure 6 displays the product line designated as System 4 and the soil borings installed along this product line.

Additional soil borings were also placed in the area of the former dispensing facility. A total of six soil borings were installed around this former dispensing area, including SB-1 which was installed in the area where the product line joins the dispensing area. Soil samples taken for OVA analysis from SB-46 through SB-50 contained values below detection limits. However, as previously mentioned, SB-1 contained excessive levels of petroleum contamination at a depth of 7 feet BLS. The locations for the soil borings around this dispensing facility are displayed in Figure 7.

The threshold for excessively contaminated soil was set at 50 parts per million (ppm) following Chapter 62-770.200(2) for mixed product group contamination sources. The Closure Assessment Form is included in Appendix A.

The soil collected for analysis was scanned with a Foxboro Century 128, organic vapor analyzer (OVA). This instrument is a flame ionization detector (FID) used to conduct field analysis of soil samples. Standard manufacturers operating procedures were followed and all field calibrations were made according to manufacturer's recommendations.

The soil samples were sealed in half-filled 16 ounce glass jars and the OVA readings were taken in the headspace above the soil as recommended by FDEP's Guidelines for Assessments and Remediation of Petroleum Contaminated Soils and in accordance with Florida Administrative Code

(FAC) Chapter 62-770.200(2). Duplicate soil samples were collected from each test site so that samples could be analyzed for total biogenic content using a carbon filter attachment. Total Volatile Hydrocarbons (TVH) were then determined by subtracting the biogenic reading from the OVA reading.

SUMMARY

During Product Line Closure Assessment activities of the product line systems affiliated with tank #2891 and tank #2892, JSA installed fifty-two soil borings in the soil located around the product lines involved in this product line closure assessment. Soil borings were installed along the product lines on a 100-foot interval basis. Soil borings were also installed in the areas of product line direction changes and also in the areas of valve junction stations and product line termination areas. While the majority of the soil collected for OVA analysis revealed values below detection limits, soil samples collected from SB-1, SB-12, SB-17, SB-38, SB-39, SB-40, SB-41, SB-42, SB-43, SB-44, and SB-45 revealed excessive levels of petroleum contamination (>50 ppm). A Discharge Reporting Form has been prepared for submittal and is included in Appendix B.

TABLES

WHITING FIELD
UNITED STATES NAVAL AIR STATION
MILTON, FLORIDA
FDEP FACILITY ID #: 578516386

TABLE 1

SB LOCATION	DEPTH (ft)	OVA (ppm)	BIO (ppm)	TVH (ppm)	SOIL DESCRIPTION
SB - 1	1	<1	<1	<1	TAN SAND
SB - 1	3	<1	<1	<1	TAN SAND
SB - 1	5	<1	<1	<1	TAN SAND
SB - 1	7	640	29	611	TAN SANDY CLAY
SB - 2	1	<1	<1	<1	TAN SAND
SB - 2	3	<1	<1	<1	TAN SAND
SB - 2	5	<1	<1	<1	TAN SAND
SB - 2	7	<1	<1	<1	TAN SAND
SB - 3	1	<1	<1	<1	TAN & BROWN SANDY CLAY
SB - 3	3	<1	<1	<1	TAN SAND
SB - 3	5	<1	<1	<1	TAN SAND
SB - 3	7	<1	<1	<1	TAN SAND
SB - 4	1	<1	<1	<1	TAN & ORANGE SANDY CLAY
SB - 4	3	<1	<1	<1	TAN SAND
SB - 4	5	<1	<1	<1	TAN SAND
SB - 4	7	<1	<1	<1	TAN SAND
SB - 5	1	<1	<1	<1	TAN SAND
SB - 5	3	<1	<1	<1	DARK SAND
SB - 5	5	<1	<1	<1	TAN SAND
SB - 5	7	<1	<1	<1	TAN SAND
SB - 6	1	<1	<1	<1	TAN SANDY CLAY
SB - 6	3	<1	<1	<1	TAN SAND
SB - 6	5	<1	<1	<1	TAN SAND
SB - 6	7	<1	<1	<1	BROWN CLAYEY SAND
SB - 7	1	<1	<1	<1	BROWN SANDY CLAY
SB - 7	3	<1	<1	<1	TAN SAND
SB - 7	5	<1	<1	<1	TAN SAND
SB - 7	7	<1	<1	<1	TAN & BROWN CLAYEY SAND
SB - 8	1	<1	<1	<1	TAN & BROWN SANDY CLAY
SB - 8	3	<1	<1	<1	TAN SAND
SB - 8	5	<1	<1	<1	TAN SAND
SB - 8	7	<1	<1	<1	TAN & BROWN CLAYEY SAND
SB - 9	1	<1	<1	<1	TAN & BROWN SANDY CLAY
SB - 9	3	<1	<1	<1	TAN SAND
SB - 9	5	<1	<1	<1	TAN SAND
SB - 9	7	<1	<1	<1	BROWN & ORANGE SAND
SB - 10	1	<1	<1	<1	TAN & ORANGE SANDY CLAY
SB - 10	3	<1	<1	<1	TAN SAND
SB - 10	5	<1	<1	<1	TAN SAND
SB - 10	7	<1	<1	<1	TAN & BROWN CLAYEY SAND
					TAN & BROWN SANDY CLAY

OVA - Organic Vapor Analyzer
B - Biogenic Reading
TVH - Total Volatile Hydrocarbons
PPM - Parts Per Million
SB - Soil Boring

WHITING FIELD
UNITED STATES NAVAL AIR STATION
MILTON, FLORIDA
FDEP FACILITY ID #: 578516386

TABLE 1 (CONT.)

SB LOCATION	DEPTH (ft)	OVA (ppm)	BIO (ppm)	TVH (ppm)	SOIL DESCRIPTION
SB - 11	1	<1	<1	<1	TAN SAND
SB - 11	3	<1	<1	<1	TAN SAND
SB - 11	5	<1	<1	<1	BROWN SAND
SB - 11	7	<1	<1	<1	TAN & BROWN SANDY CLAY
SB - 12	1	<1	<1	<1	TAN SAND
SB - 12	3	<1	<1	<1	TAN SAND
SB - 12	5	250	2	248	TAN & GREY SAND
SB - 12	7	440	4.4	435.6	TAN & GREY SAND
SB - 13	1	<1	<1	<1	TAN SAND
SB - 13	3	<1	<1	<1	TAN SAND
SB - 13	5	<1	<1	<1	TAN SAND
SB - 13	7	<1	<1	<1	TAN SANDY CLAY
SB - 14	1	<1	<1	<1	TAN SAND
SB - 14	3	<1	<1	<1	TAN SANDY CLAY
SB - 14	5	<1	<1	<1	TAN SAND
SB - 14	7	<1	<1	<1	TAN SANDY CLAY
SB - 15	1	<1	<1	<1	DARK SAND
SB - 15	3	<1	<1	<1	TAN SAND
SB - 15	5	<1	<1	<1	TAN SANDY CLAY
SB - 15	7	<1	<1	<1	TAN SANDY CLAY
SB - 16	1	<1	<1	<1	REDISH SAND
SB - 16	3	<1	<1	<1	TAN SANDY CLAY
SB - 16	5	<1	<1	<1	TAN SANDY CLAY
SB - 16	7	<1	<1	<1	TAN SANDY CLAY
SB - 17	1	<1	<1	<1	TAN SAND
SB - 17	3	>1000	<1	>1000	GREY & TAN SANDY CLAY
SB - 17	4	>1000	<1	>1000	GREY & TAN SANDY CLAY
SB - 18	1	<1	<1	<1	TAN SAND
SB - 18	3	<1	<1	<1	TAN & BROWN CLAYEY SAND
SB - 18	4	1.2	<1	1.2	BROWN SANDY CLAY
SB - 19	1	<1	<1	<1	TAN SAND
SB - 19	3	<1	<1	<1	TAN SAND
SB - 19	5	<1	<1	<1	GREY & WHITE CLAYEY SAND
SB - 19	7	<1	<1	<1	GREY & WHITE CLAYEY SAND
SB - 20	1	<1	<1	<1	TAN SAND
SB - 20	3	<1	<1	<1	TAN SAND
SB - 20	5	<1	<1	<1	TAN & BROWN CLAYEY SAND
SB - 20	7	<1	<1	<1	TAN & BROWN SANDY CLAY
SB - 21	1	<1	<1	<1	TAN SAND
SB - 21	3	<1	<1	<1	TAN SAND

OVA - Organic Vapor Analyzer
BIO - Biogenic Reading
TVH - Total Volatile Hydrocarbons
PPM - Parts Per Million
SB - Soil Boring

WHITING FIELD
UNITED STATES NAVAL AIR STATION
MILTON, FLORIDA
FDEP FACILITY ID #: 578516386

TABLE 1 (CONT.)

SB LOCATION	DEPTH (ft)	OVA (ppm)	BID (ppm)	TVH (ppm)	SOIL DESCRIPTION
SB - 21	5	<1	<1	<1	BROWN CLAYEY SAND
SB - 21	7	<1	<1	<1	BROWN SANDY CLAY
SB - 22	1	N/A	N/A	N/A	
SB - 22	3	<1	<1	<1	TAN SAND
SB - 22	5	<1	<1	<1	TAN & BROWN CLAYEY SAND
SB - 22	7	<1	<1	<1	TAN & BROWN SANDY CLAY
SB - 23	1	<1	<1	<1	TAN SAND
SB - 23	3	<1	<1	<1	TAN SAND
SB - 23	5	<1	<1	<1	BROWN CLAYEY SAND
SB - 23	7	<1	<1	<1	BROWN SANDY CLAY
SB - 24	1	<1	<1	<1	TAN SAND
SB - 24	3	<1	<1	<1	TAN SAND
SB - 24	5	<1	<1	<1	BROWN CLAYEY SAND
SB - 24	7	<1	<1	<1	BROWN SANDY CLAY
SB - 25	1	<1	<1	<1	TAN SAND
SB - 25	3	<1	<1	<1	TAN SAND
SB - 25	5	<1	<1	<1	BROWN CLAYEY SAND
SB - 25	7	<1	<1	<1	BROWN SANDY CLAY
SB - 26	1	<1	<1	<1	TAN SAND
SB - 26	3	<1	<1	<1	TAN SAND
SB - 26	5	<1	<1	<1	TAN SANDY CLAY
SB - 26	7	<1	<1	<1	TAN SANDY CLAY
SB - 27	1	<1	<1	<1	DARK SAND
SB - 27	3	<1	<1	<1	TAN SAND
SB - 27	5	<1	<1	<1	TAN SANDY CLAY
SB - 27	7	<1	<1	<1	TAN SANDY CLAY
SB - 28	1	<1	<1	<1	TAN SAND
SB - 28	3	<1	<1	<1	TAN SAND
SB - 28	5	<1	<1	<1	TAN SANDY CLAY
SB - 28	7	<1	<1	<1	TAN SANDY CLAY
SB - 29	1	<1	<1	<1	TAN SAND
SB - 29	3	<1	<1	<1	TAN SAND
SB - 29	5	<1	<1	<1	TAN SANDY CLAY
SB - 29	7	<1	<1	<1	TAN SANDY CLAY
SB - 30	1	<1	<1	<1	TAN SAND
SB - 30	3	<1	<1	<1	TAN SAND
SB - 30	5	<1	<1	<1	RED SANDY CLAY
SB - 30	7	<1	<1	<1	RED SANDY CLAY
SB - 31	1	<1	<1	<1	TAN SAND
SB - 31	3	<1	<1	<1	TAN SAND

OVA - Organic Vapor Analyzer
- Biogenic Reading
TVH - Total Volatile Hydrocarbons
PPM - Parts Per Million
SB - Soil Boring

WHITING FIELD
UNITED STATES NAVAL AIR STATION
MILTON, FLORIDA
FDEP FACILITY ID #: 578516386

TABLE 1 (CONT.)

SB LOCATION	DEPTH (ft)		BIO (ppm)	TVH (ppm)	SOIL DESCRIPTION
SB - 31	5		<1		RED SANDY CLAY
	7		<1		RED SANDY CLAY
	1		<1		DARK SAND
	3		<1		TAN SAND
SB - 32	5	<1	<1		TAN SANDY CLAY
	7		<1		TAN SANDY CLAY
SB - 33	8		<1		GRAVEL & SAND FILL
	10		<1		BROWN SANDY CLAY
	12		<1		BROWN SANDY CLAY
SB - 34	8	<1	<1	<1	GRAVEL & SAND FILL
SB - 34	10	<1	<1	<1	BROWN SANDY CLAY
SB - 34	12	<1	<1	<1	BROWN SANDY CLAY
SB - 34	14	<1			BROWN SANDY CLAY
SB - 34	16	<1			BROWN SANDY CLAY
SB - 34	18	<1	<1	<1	BROWN SANDY CLAY
SB - 34	20	<1	<1	<1	BROWN SANDY CLAY (DARK)
SB - 35	8	<1	<1	<1	GRAVEL & SAND FILL
SB - 35	10	<1	<1	<1	BROWN SANDY CLAY
SB - 35					
SB - 36	1				
SB - 36	1				
SB - 36					
SB - 36	1				
SB - 37	1				
SB - 37	1				
SB - 37	1				
	1				
	1				
	1				
	1				
SB - 38	7	300	120	180	DARK SANDY CLAY
SB - 39	1	<1	<1	<1	TAN
SB - 39	3	1			
SB - 39	1		15	265	DARK SANDY CLAY
	1		<1	<1	TAN SANDY CLAY
	1		<1	<1	TAN SANDY CLAY
	1		32	638	GREY & TAN SANDY CLAY
SB - 41	1		<1	<1	TAN SAND
SB - 41	1		<1	<1	GREY & TAN SANDY CLAY
SB - 41	1		62	>938	GREY & TAN SANDY CLAY

OVA - Organic Vapor Analyzer
BIO - Biogenic Reading
TVH - Total Volatile Hydrocarbons
PPM - Parts Per Million
SB - Soil Boring

WHITING FIELD
UNITED STATES NAVAL AIR STATION
MILTON, FLORIDA
FDEP FACILITY ID #: 578516386

TABLE 1 (CONT.)

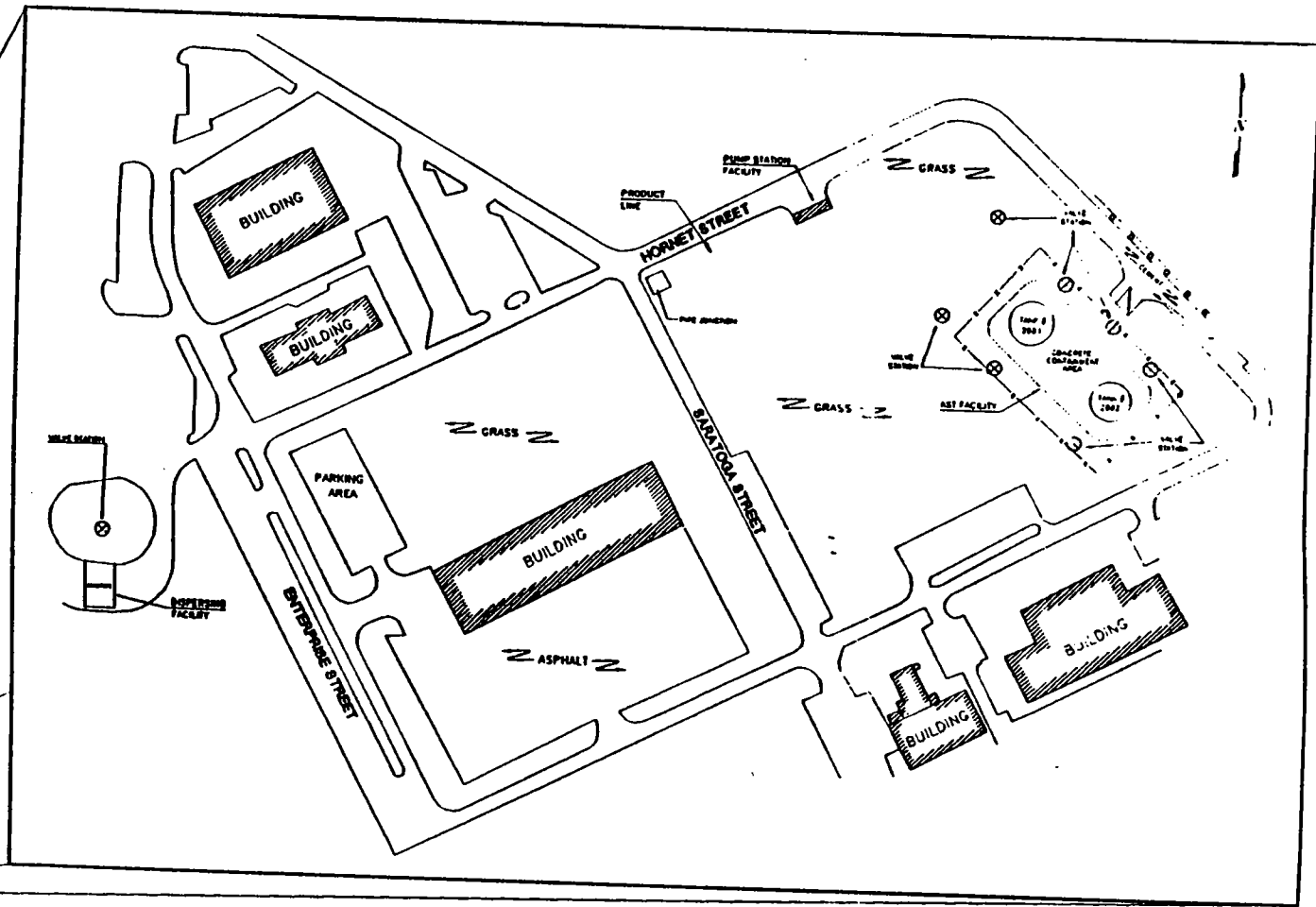
SB LOCATION	DEPTH (ft)	OVA (ppm)	BIO (ppm)	TVH (ppm)	SOIL DESCRIPTION
SB - 42	1	<1	<1	<1	TAN & BROWN SAND
SB - 42	3	>1000	360	>640	GREY SAND
SB - 42	4	500	60	440	GREY SAND
SB - 43	1	21	9.3	11.7	BROWN SAND
SB - 43	3	>1000	120	>880	GREY SAND
SB - 43	4	>1000	28	>972	GREY SAND
SB - 44	1	29	11	18	TAN SAND
SB - 44	3	150	215	INV	GREY SAND
SB - 44	4	320	140	180	GREY SAND
SB - 45	1	<1	<1	<1	BROWN SAND
SB - 45	3	90	36	54	GREY SAND
SB - 45	4	110	26	84	GREY SAND
SB - 46	1	<1	<1	■ ■ ■	TAN SAND
SB - 46	3	<1	<1	■ ■ ■	TAN SAND
SB - 46	5	<1	<1	■ ■ ■	BROWN CLAYEY SAND
SB - 46	7	<1	<1	■ ■ ■	BROWN SANDY CLAY
SB - 47	1	<1	<1	■ ■ ■	TAN SAND
SB - 47	3	<1	<1	■ ■ ■	TAN SAND
SB - 47	5	<1	<1	■ ■ ■	BROWN CLAYEY SAND
SB - 47	7	<1	<1	■ ■ ■	BROWN SANDY CLAY
SB - 48	1	<1	<1	■ ■ ■	TAN SAND
SB - 48	3	<1	<1	■ ■ ■	TAN SAND
SB - 48	5	<1	<1	■ ■ ■	TAN CLAYEY SAND
SB - 48	7	<1	<1	■ ■ ■	BROWN SANDY CLAY
SB - 49	1	<1	<1	■ ■ ■	TAN SAND
SB - 49	3	<1	<1	■ ■ ■	TAN SAND
SB - 49	5	<1	<1	■ ■ ■	TAN CLAYEY SAND
SB - 49	7	<1	<1	■ ■ ■	BROWN SANDY CLAY
SB - 50	1	<1	<1	■ ■ ■	TAN SAND
SB - 50	3	<1	<1	<1	TAN SAND
SB - 50	5	<1	<1	<1	BROWN CLAYEY SAND
SB - 50	7	<1	<1	<1	BROWN SANDY CLAY
SB - 51	1	<1	<1	<1	GREY SAND
SB - 51	3	<1	<1	<1	GREY SAND
SB - 51	5	<1	<1	<1	TAN SAND
SB - 51	7	<1	<1	<1	GREY SAND
SB - 52	1	<1	<1	<1	GREY SAND
SB - 52	3	<1	<1	<1	BROWN SAND
SB - 52	5	<1	<1	<1	GREY SAND
SB - 52	7	<1	<1	<1	GREY SAND

OVA - Organic Vapor Analyzer
BIO - Biogenic Reading
TVH - Total Volatile Hydrocarbons
PPM - Parts Per Million
SB - Soil Boring
INV - Invalid

FIGURES

FLORIDA

MILTON



SITE LOCATION DIAGRAM

SCALE: NIS
DATE: 4/5/96

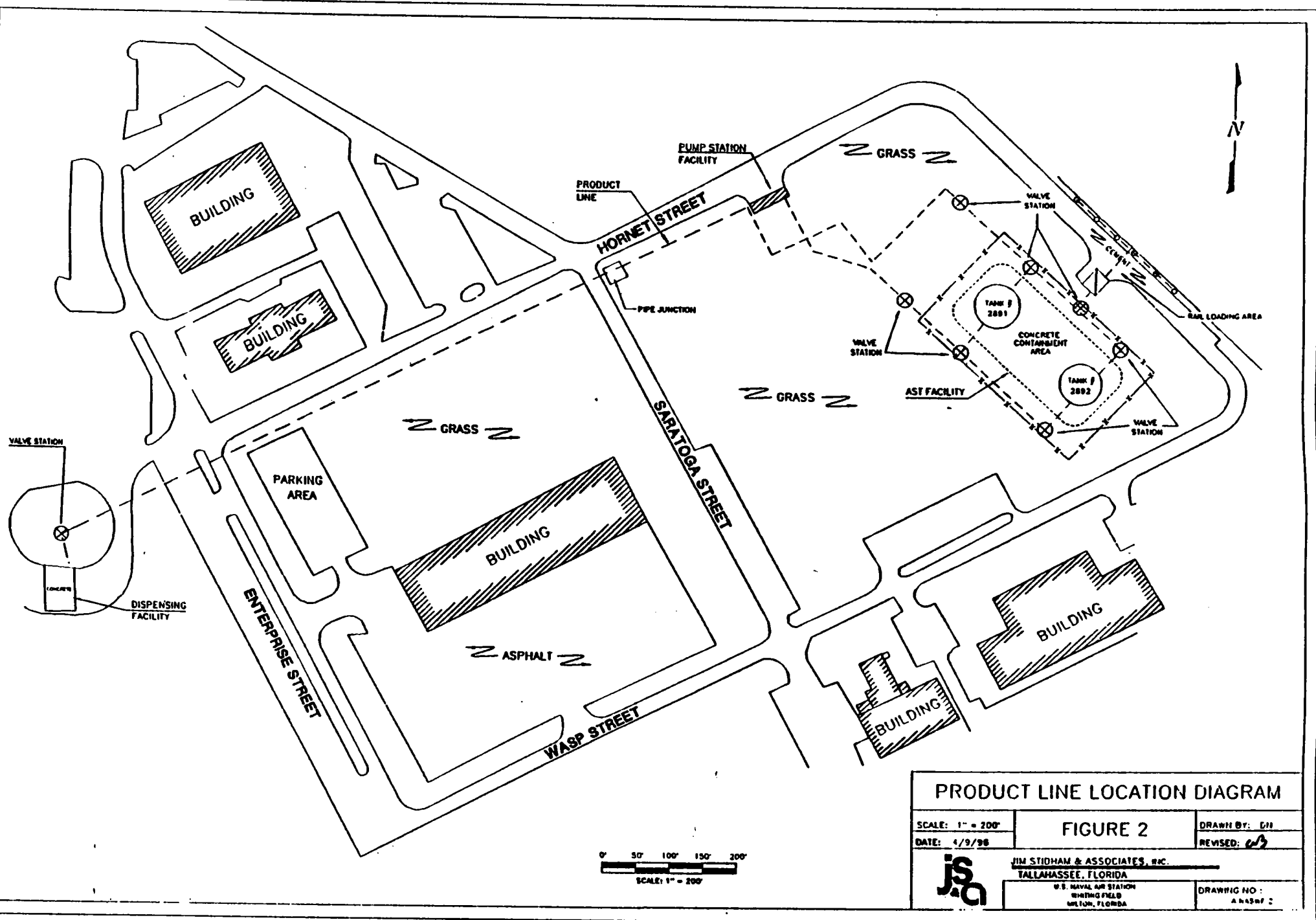
FIGURE 1

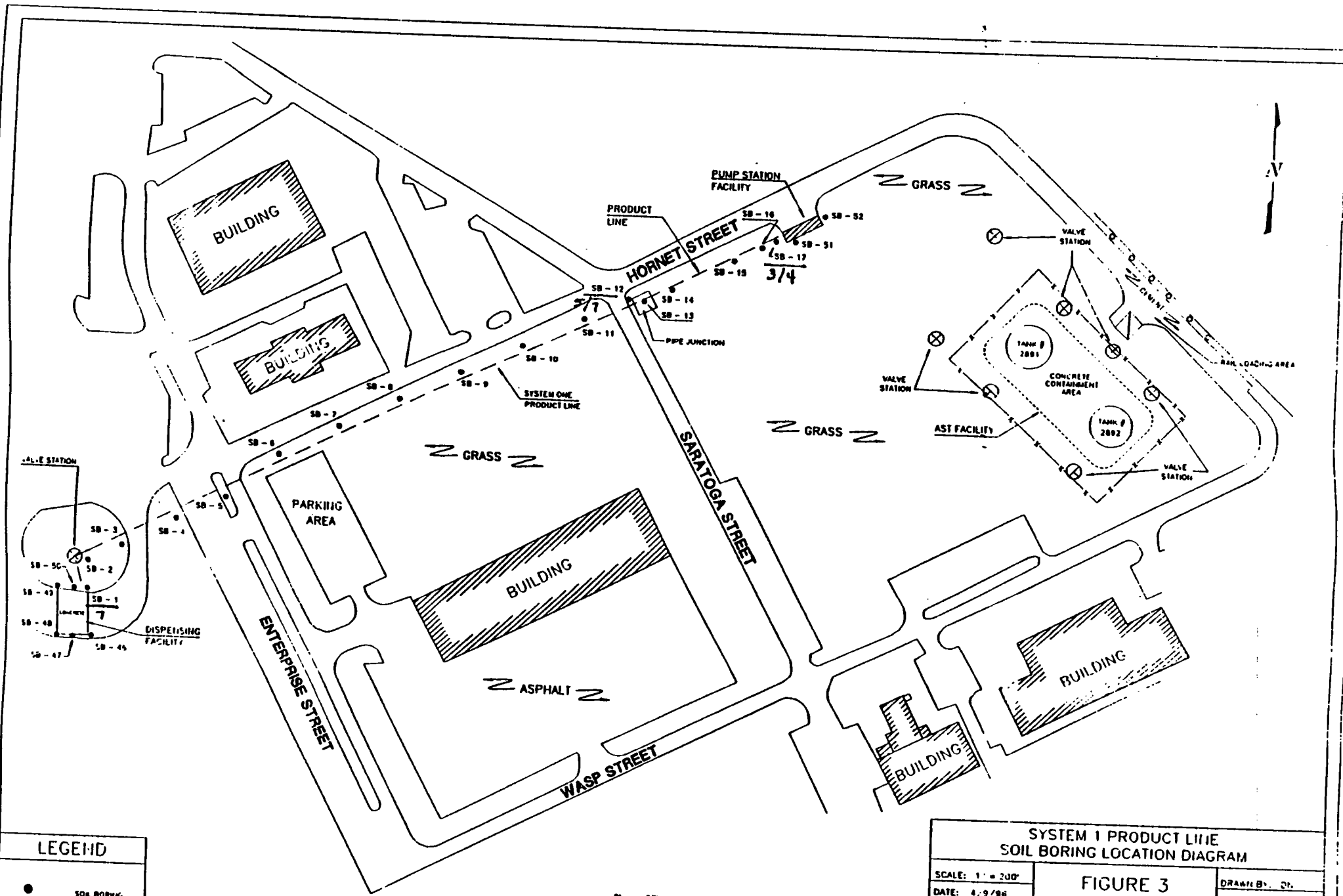
DRAWN BY: JH
REVISED BY: JH



JIM STIDHAM & ASSOCIATES, INC.
TALLAHASSEE, FLORIDA
WHITING FIELD
MILTON, FLORIDA

DRAWING NO. 001000...

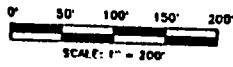





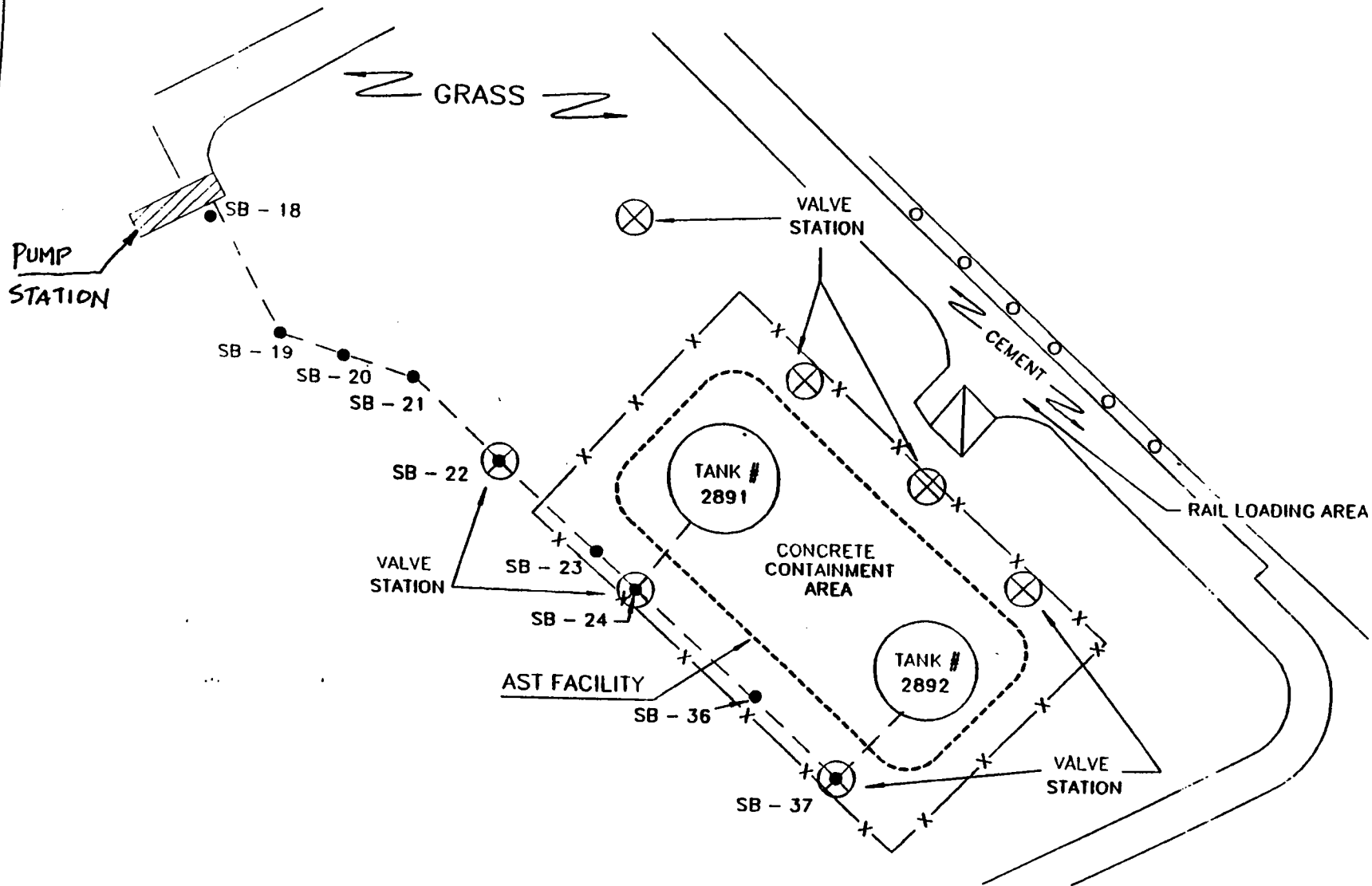
LEGEND

● SOIL BORING

SB - 1



SYSTEM 1 PRODUCT LINE SOIL BORING LOCATION DIAGRAM		
SCALE: 1" = 200'	FIGURE 3	DRAWN BY: DT
DATE: 4/9/98		REVISED:
 JIM STIDHAM & ASSOCIATES, INC. TALLAHASSEE, FLORIDA U.S. NAVAL AIR STATION WRIGHT FIELD MILTON, FLORIDA		
DRAWING NO. 4-1424-1-3		



LEGEND

● SOIL BORING
SB - #

0' 25' 50' 75' 100'
SCALE: 1" = 100'

SYSTEM 2 PRODUCT LINE SOIL BORING LOCATION DIAGRAM

SCALE: 1" = 100'

DATE: 4/9/96

FIGURE 4

DRAWN BY: C.

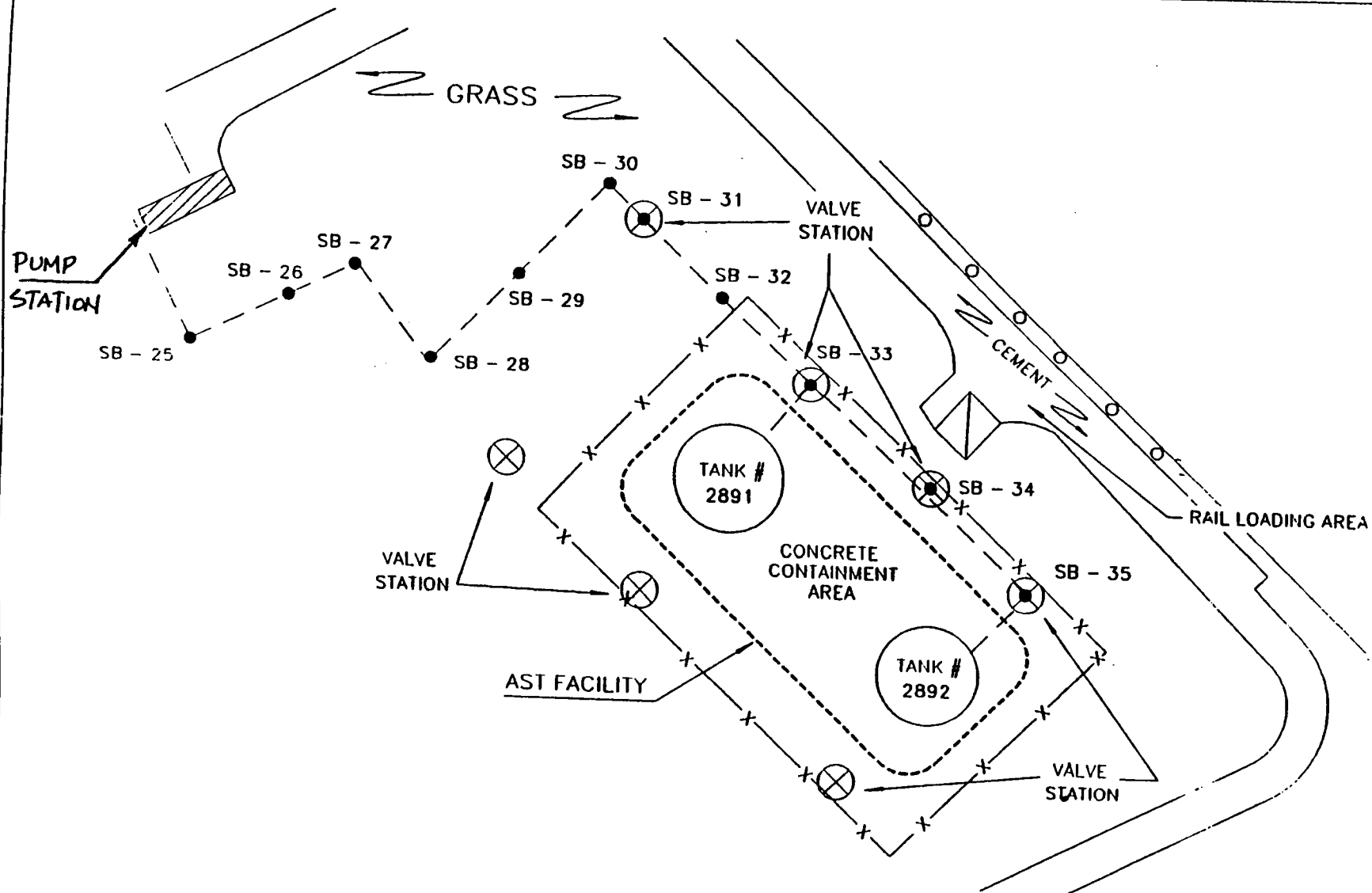
REVISED:



JIM STIDHAM & ASSOCIATES, INC.
TALLAHASSEE, FLORIDA

U.S. NAVAL AIR STATION
WHITING FIELD
MILTON, FLORIDA

DRAWING NO. A NASAF 4



LEGEND

● SOIL BORING
SB - #

0' 25' 50' 75' 100'
SCALE: 1" = 100'

SYSTEM 3 PRODUCT LINE SOIL BORING LOCATION DIAGRAM

SCALE: 1" = 100'
DATE: 4/2/96

FIGURE 5

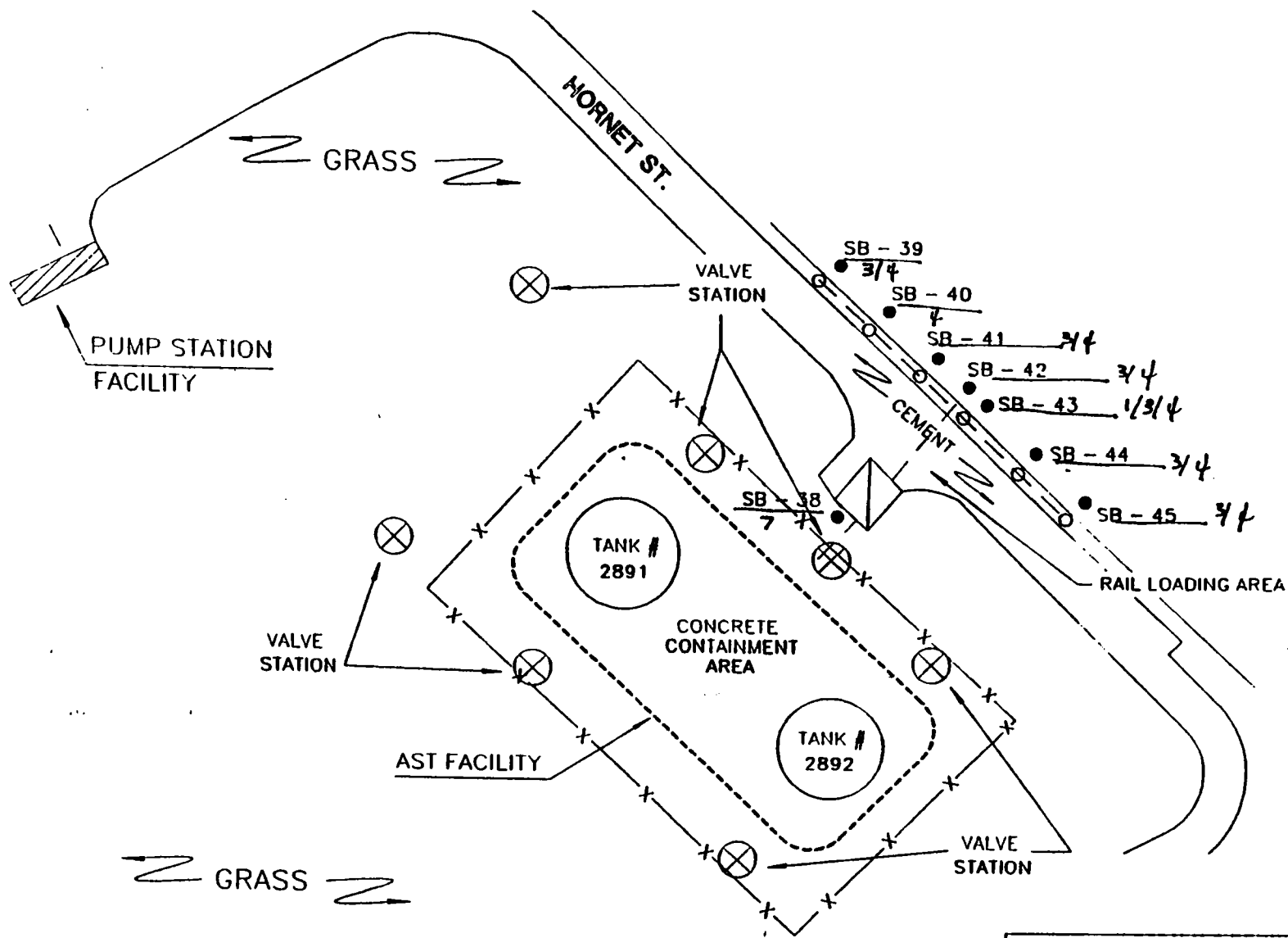
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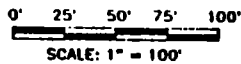
JIM STIDHAM & ASSOCIATES, INC.
TALLAHASSEE, FLORIDA


U.S. NAVAL AIR STATION
WHITING FIELD
MELTON, FLORIDA

DRAWING NO.
A NASAF 2

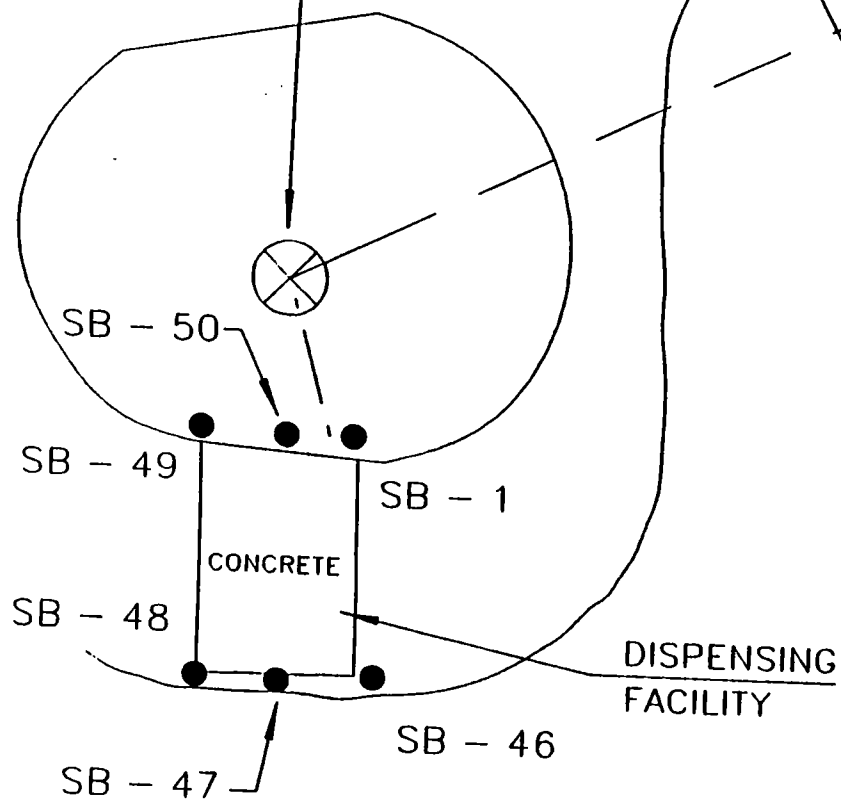


LEGEND	
●	SOIL BORING
SB - 1	



SYSTEM 4 PRODUCT LINE SOIL BORING LOCATION DIAGRAM		
SCALE: 1" = 100'	FIGURE 6	DRAWN BY: JN
DATE: 4/9/96		REVISED
	JIM SITHAM & ASSOCIATES, INC. TALLAHASSEE, FLORIDA	
	U.S. NAVAL AIR STATION WHITING FIELD MILTON, FLORIDA	
		DRAWING NO.: A NASAF 6

VALVE STATION



PARKING
AREA

ENTERPRISE STREET

DISPENSING
FACILITY

0' 30' 60'
SCALE: 1" = 60'

LEGEND

● SB-# SOIL BORING

DISPENSING AREA SOIL BORING LOCATION DIAGRAM

SCALE: 1" = 60'

DATE: 4/9/96

FIGURE 7

DRAWN BY: DJ

REVISED:



JIM STIDHAM & ASSOCIATES, INC.
TALLAHASSEE, FLORIDA

U.S. NAVAL AIR STATION
WHITING FIELD
MILTON, FLORIDA

DRAWING NO.
A NASAF

APPENDIX A



Closure Assessment Form

Owners of storage tank systems that are replacing, removing or closing in place storage tanks shall use this form to demonstrate that a system closure assessment was performed in accordance with Rule 17-761 or 17-762, Florida Administrative Code. Eligible Early Detection (ED) and Reimbursement Program sites do not have to perform a closure assessment.

Please Print or Type
Complete All Applicable Blanks

- Date: April 12, 1996
- DER Facility ID Number: 578516386
- County: Santa Rosa County
- Facility Name: Whiting Field, Naval Air Station
- Facility Owner: Whiting Field, Naval Air Station
- Facility Address: HWY 87 A, Milton, Florida 32570
- Mailing Address: HWY 87 A, Milton, Florida 32570
- Telephone Number: (904) 623-7181
- Facility Operator: Whiting Field, NAS
- Are the Storage Tank(s): (Circle one or both) A. Aboveground or B. Underground
- Type of Product(s) Stored: Jet Fuel #5 (JP-5)
- Were the Tank(s): (Circle one) A. Replaced B. Removed C. Closed in Place D. Upgraded (aboveground tanks only)
- Number of Tanks Closed: Product line ONLY
- Age of Tanks: N/A

Facility Assessment Information

Yes	No	Not Applicable
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Is the facility participating in the Florida Petroleum Liability Insurance and Restoration Program (FPLIRP)?
- Was a Discharge Reporting Form submitted to the Department?
If yes, When: _____ Where: Escambia Co. Public Works
- Is the depth to ground water less than 20 feet?
- Are monitoring wells present around the storage system?
If yes, specify type: ☒ Water monitoring ☐ Vapor monitoring
- Is there free product present in the monitoring wells or within the excavation?
- Were the petroleum hydrocarbon vapor levels in the soils greater than 500 parts per million for gasoline?
Specify sample type: ☐ Vapor Monitoring wells ☐ Soil sample(s)
- Were the petroleum hydrocarbon vapor levels in the soils greater than 50 parts per million for diesel/kerosene?
Specify sample type: ☐ Vapor Monitoring wells ☒ Soil sample(s)
- Were the analytical laboratory results of the ground water sample(s) greater than the allowable state target level (See target levels on reverse side of this form and supply laboratory data sheets)
- If a used oil storage system, did a visual inspection detect any discolored soil indicating a release?
- Are any potable wells located within 1/4 of a mile radius of the facility?
- Is there a surface water body within 1/4 mile radius of the site? If yes, indicate distance: _____

12. A detailed drawing or sketch of the facility that includes the storage system location, monitoring wells, buildings, storm drains, sample locations and dispenser locations must accompany this form.
13. If a facility has a pollutant storage tank system that has both gasoline and kerosene/diesel stored on site, both EPA Method 602 and EPA Method 610 must be performed on the ground water samples obtained.
14. Amount of soils removed and receipt of proper disposal.
15. If yes is answered to any one of questions 5-9, a Discharge Reporting Form 17-761.900(1) indicating a suspected release shall be submitted to the Department within one working day.
16. A copy of this form and any attachments must be submitted to the Department's district office in your area and to the locally administered program office under contract with the Department within 60 days of completion of tank removal or filling a tank with an inert material.

Signature of Owner

Date

4/12/96

Signature of Person Performing Assessment

Date

CHRIS E. BROCKMEIER, E.I. - PROJECT ENGINEER - JIM STODOLAN & ASSOC, INC.

Title of Person Performing Assessment

State Ground Water Target Levels That Affect A Pollutant Storage Tank System Closure Assessment

State ground water target levels are as follows:

1. For gasoline (EPA Method 602):

- a. Benzene 1 ug/l
- b. Total VOA 50 ug/l
 - Benzene
 - Toluene
 - Total Xylenes
 - Ethylbenzene
- c. Methyl Test-Butyl Ether (MTBE) 50 ug/l

2. For kerosene/diesel (EPA Method 610):

- a. Polynuclear Aromatic Hydrocarbons (PAHS)
(Best achievable detection limit, 10 ug/l maximum)

APPENDIX E

SOIL BORING LOGS



SOUTHNAVFAC

LOG OF BORING

OWS-
SB-01

Page 1 of 1

OBJECT NO: CTO 0037

PROJECT NAME: Oil/Water Separator Investigation

OBJECT LOCATION: NAS Whiting Field

DATE DRILLED: 11/18/97

DRILLING COMPANY: Precision Sampling

SURFACE ELEVATION: Feet

DRILLING METHOD: Direct Push (DP)

BORING DIAMETER: 3 Inches

DRILLING RIG: SD-2

GEOLOGIST: Gerald Goode

DEPTH feet	SAMPLE NUMBER	BLOKS/FT.	PID (ppm)				GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
	SS-1	6in	NO/NO					SP	Sand, yellowish Orange, medium grained, trace of organics and fines	
	SS-2	6in	NO/NO					SM	Sand, yellowish Orange, fine to medium grained some silt, non plastic, wet	
5	SS-3	↑	40/100 NO			NO		CH	Clay, light brown, mottled red and white, stiff, slight plasticity, moist, (Fuel like odor), some fine to medium grained sand seams	
	SS-4		20/170					SM	Silty Sand, light brown to reddish, fine to medium grained, low plasticity, fine, moist	
	SS-5		20/800 NO			NO		CL	Sandy Clay, light reddish brown, slightly plastic, medium stiff, moist	
	SS-6		NO/150						End of Boring	
	SS-7		NO/10							
20	SS-8		NO/NO							
25										
30										
35										



OWS -
5B02

Page 1 of 1

PROJECT NO: CTD 0037

PROJECT NAME: O:1/Water Separator Investigation

DATE DRILLED: 11/18/97

DRILLING COMPANY: Precision Sampling

SURFACE ELEVATION: Feet

DRILLING METHOD: Direct Push (DP)

BORING DIAMETER: 3 Inches

DRILLING RIG: SQ-2

GEOLOGIST: Gerald Goode

GEOLOGIST: Gerald Goode											
DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered PID (ppm)		B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	Untiltered							
	SS-1	6rb	NO/NO						SP	Sand, yellowish Orange, medium grained, trace of fines, some organic matter, moist	
	SS-2	6rb	NO/NO						SC		
5	SS-3	OP	NO/NO		ND		NP			Clayey Sand, yellowish Orange, fine to medium grained, slightly plastic fines, wet at 4' bls.	
	SS-4		NO/NO								
10	SS-5		NO/NO		ND		ND		SM	Silty Sand, yellowish Orange, fine to medium grained, non plastic fines dry	
	SS-6		NO/NO						CH		
			NO/NO						SM	Clay light reddish brown, mottled gray and dark red, medium stiff, plastic, moist	
20										Silty Sand, yellowish Orange, fine to medium grained, non plastic fines, dry	
25										End of Boring	
30											
35											
40											

LOG OF BORING ^{OWS-}SB03

Page 1 of 1

PROJECT NO: CTO 0037

PROJECT LOCATION: *NAS Whiting Field*

DRILLING COMPANY: Precision Sampling

DRILLING METHOD: Direct Push (DP)

DRILLING RIG: SD-2

PROJECT NAME: Oil/Water Separator Investigation

DATE DRILLED: 11/18/97

SURFACE ELEVATION: *Feet*

BORING DIAMETER: *3 Inches*

GEOLOGIST: Gerald Goode

GEOLOGIST: Gerald Goode										
DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered PID (ppm) Unfiltered				GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
	SS-1	Grab	NO/ND					SP	Sand, yellowish Orange, medium grained, some organics, trace of fines wet at 4' bls	
	SS-2	Grab	NO/ND							
5		↑								
	SS-3	OP	NO/ND					SM	Silty Sand, yellowish Orange, fine to medium grained, slightly plastic fines, moist	
10	SS-4		20/20	ND		UP				
	SS-5		NO/ND					CH	Clay, light reddish brown, mottled light brown and dark red, stiff, slightly plastic, moist	
15	SS-6		NO/ND	NO		NO		SM		
		↓						CH	Silty Sand, yellowish Orange and reddish brown, clay, soft, moist	
0									End of Boring	
5										
0										



Page 1 of 1

PROJECT NAME: Oil/Water Separator Investigation

DATE DRILLED: 11/18/97

SURFACE ELEVATION: *Feet*

BORING DIAMETER: 3 Inches

GEOLOGIST: Gerald Goode

GEOLOGIST: Gerald Goode											
DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered PID (ppm)		B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	Unfiltered							
SS-1	Grab		ND/ND						SP	Sand, yellowish Orange, fine to medium grained, trace of fines, wet at 4' bls	
SS-2	Grab		ND/ND								
5	SS-3	DP	ND/ND		ND		ND		cy ch	Sandy Clay and Clay light reddish brown, slightly plastic, medium stiff, moist	
SS-4			ND/ND								
10	SS-5		ND/ND		ND		ND		SC	Clayey Sand, yellowish Orange, fine to medium grained, plastic fines moist	
SS-6			ND/ND						CL	Sandy Clay, light reddish brown, mottled light brown and gray, soft, moist	
										End of Boring	



SOUTHNAVFAC

LOG OF BORING ^{OWS-}SBOS

Page 1 of 1

PROJECT NO: CTD 0037

PROJECT LOCATION: NAS Whiting Field

DRILLING COMPANY: Precision Sampling

DRILLING METHOD: Direct Push (DP)

DRILLING RIG: SD-2

PROJECT NAME: Oil/Water Separator Investigation

DATE DRILLED: 11/18/97

SURFACE ELEVATION: Feet

BORING DIAMETER: 3 Inches

GEOLOGIST: Gerald Goode

GEOLOGIST: Gerald Goode										
DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered PID (ppm) unfiltered				GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
5	SS-1	6/0b	ND/ND						SP Sand, yellowish Orange, Fine to medium grained, trace of fines, wet at 4' bls	
	SS-2	6/0b	ND/5							
	SS-3	DP	ND/ND	ND		ND			CL Sandy Clay, light reddish brown (fuel staining from 5 to 6' bls, fuel like odor present from 5 to 10' bls) slightly plastic, soft, moist	
	SS-4		ND/5000							
10			ND/1500							
	SS-5		ND/250							
15	SS-6		ND/1000 ND			ND			SC Clayey Sand, light reddish brown, fine to medium grained, fines slightly plastic	
	SS-7		50/350							
20	SS-8		0/50 ND			ND			SM Silty Sand, yellowish to light brown fine to medium grained, slightly plastic fines, moist	
	SS-9		ND/ND							
25									CH Clay light brown, mottled gray and white, soft moist	
30									End of Boring	
35										
40										



OWS.
SBOB

Page 1 of 1

PROJECT NAME: Oil/Water Separator Investigation
DATE REVISED: 11/12/97

DATE DRILLED: 11/19/97

SUBJECT LOCATION: NAS Whiting Field

DRILLING COMPANY: Precision Sampling

SURFACE ELEVATION: Feet

DRILLING METHOD: Direct Push (DP)

BORING DIAMETER: 3 Inches

DRILLING RIG: 50-2

GEOLOGIST: Gerald Goode

[illegible]



Page 1 of 1

PROJECT NAME: O1/Water Separator Investigation

DATE DRILLED: 11/19/97

DRILLING COMPANY: Precision Sampling

SURFACE ELEVATION: *Feet*

DRILLING METHOD: Direct Push (DP)

BORING DIAMETER: 3 Inches

DRILLING RIG: 50-2

GEOLOGIST: Gerald Goode

[illegible]



SOUTHNAV FAC

LOG OF BORING

OWS-

SB-12

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ID: CTD 0037

LOCATION: NAS Whiting Field

COMPANY: Precision Sampling

METHOD: Direct Push (DP)

LOG: SD-2

PROJECT NAME: Oil/Water Separator Investigation

DATE DRILLED: 11/19/97

SURFACE ELEVATION: Feet

BORING DIAMETER: 3 Inches

GEOLOGIST: Gerald Goode

BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
	Sample	B. Zone	Borehole	Drill B. Z.				
0	no/no					SP	Sand, yellowish Orange, fine to medium grained, trace of fines, wet at 4' bls	
1	no/no							
2	50/200	no		no		CL	Sandy Clay, yellowish Orange, blocky, stiff, moist	
3	50/100							
4	100/150					SC	Clayey Sand, reddish brown fine grained, slightly plastic, moist	
5	no/100							
6	30/100					CH	Clay, reddish brown, medium stiff slightly plastic, moist	
7	10/35	no		no			Clay, brown, soft, moist	
8	no/no						end of Boring	

DEPTH
feet

5

10

20

25

30

35

40

LOG OF BORING OWS-
SB-13

OWS -

SB-13

Page 1 of 1

JECT NO: CTO 0037

PROJECT NAME: Oil/Water Separator Investigation

DATE DRILLED: 11/19/97

SUBJECT LOCATION: NAS Whiting Field

SURFACE ELEVATION: *Feet*

DRILLING METHOD: Direct Push (DP)

BORING DIAMETER: 3 Inches

DRILLING RIG: 50-2

GEOLOGIST: Gerald Goode

GEOLOGIST: Gerald Goode											
DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered PID (ppm)		B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	Untiltered							
	SS-1	6.6	NO/NO						SP	Sand, yellowish Orange, very fine to fine grained, trace of fines, wet at 4' bls	
	SS-2	6.6	NO/NO								
5	SS-3	DP	NO/P						CL	Sandy Clay, yellowish Orange, mottled light brown and gray, medium stiff, slightly plastic, moist	
	SS-4		NO/NO	NO		NO					
10	SS-5		NO/NO							Clay, reddish brown to pink, medium stiff, slightly plastic, moist	
	SS-6		NO/NO						CH		
										End of Boring	
20											
25											
30											
35											
40											



SOUTHNAVFAC

LOG OF BORING

OWS -

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Page 1 of 1

PROJECT NO: CTO 0037

PROJECT LOCATION: NAS Whiting Field

DRILLING COMPANY: Precision Sampling

DRILLING METHOD: Direct Push (DP)

DRILLING RIG: SD-2

PROJECT NAME: Oil/Water Separator Investigation

DATE DRILLED: 11/19/97

SURFACE ELEVATION: Feet

BORING DIAMETER: 3 Inches

GEOLOGIST: Gerald Goode

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered PID (ppm) Unfiltered				GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
	SS-1	Grab	ND/ND						Sand, light brown, fine to medium grained, trace of fines	
	SS-2	Grab	ND/ND							
5	SS-3	DP	ND/ND					sp	Sand, yellowish orange, fine to medium grained, trace of fine and organic matter/roots, wet at 4' bls	
10	SS-4		ND/ND	ND		ND		cl	Sandy clay, reddish brown, very stiff, non-plastic, (some silt seams) dry	
	SS-5		ND/ND							
15	SS-6		ND/ND					ch	Clay, reddish brown to pink, medium stiff, highly plastic, moist	
			ND/ND						End of Boring	
20										
25										
30										
35										
40										



Page / of 1

SUBJECT NO: CTO 0037

PROJECT NAME: Oil/Water Separator Investigation

DATE DRILLED: 11/20/97

SURFACE ELEVATION: *Feet*

BORING DIAMETER: 3 Inches

GEOLOGIST: Gerald Goode

SUBJECT LOCATION: NAS Whiting Field

DRILLING COMPANY: Precision Sampling

DRILLING METHOD: Direct Push (DP)

DRILLING RIG: 50-2

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered PID (ppm)		B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	Unfiltered							
SS-1	6ab	ND/ND								Asphalt, surface to 3" bls	
SS-2	6ab	ND/ND						sp		Sand, light brown to yellowish orange, fine to medium grained, trace of fines, moist	
SS-3	6b	ND/ND									
SS-4	6b	ND/ND						sc		Clayey Sand, yellowish orange, fine to medium grained, slightly plastic fines, moist	
SS-5	6b	ND/ND									
SS-6	6b	ND/ND						cl		Sandy Clay, light reddish brown, mottled dark red and gray, medium stiff, slightly plastic, dry (Interlayered with Clayey Sand Seams From 13 to 16' bls	
End of Boring											



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Page 1 of 1

PROJECT NO: CTD 0037

PROJECT NAME: Oil/Water Separator Investigation

PROJECT LOCATION: NAS Whiting Field

DATE DRILLED: 11/20/97

DRILLING COMPANY: Precision Sampling

SURFACE ELEVATION: Feet

DRILLING METHOD: Direct Push (DP)

BORING DIAMETER: 3 Inches

DRILLING RIG: 50-2

GEOLOGIST: Gerald Goode

GEOLOGIST: Gerald Goode									
DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)		GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM	
			Sample	B. Zone					
	SS-1	Grab	ND/ND				Asphalt, Surface to 3" bls		
	SS-2	Grab	ND/ND			SP	Sand, light brown, Fine to medium grained, trace of fines, dry		
5	SS-3	DP	ND/ND				Sand, yellowish Orange, Fine to medium grained, slightly plastic Fine, dry		
	SS-4		ND/ND			CL	Sandy Clay, reddish brown, mottled light brown, pink, and gray, blocky, medium stiff, slightly plastic, dry		
10	SS-5		ND/ND	ND	ND				
	SS-6		ND/ND			CH	Clay, reddish pink, mottled dark red, light brown, and gray, medium stiff, plastic, dry		
15			ND/ND				End of Boring		
20									
5									
0									
5									
1									



LOG OF BORING

PDF-
SB01

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PROJECT NO: CTO 0037

PROJECT NAME: Product Line (Dispenser Island) Investigation
DATE DRILLED: 4/6/1977

JECT LOCATION: NAS Whiting Field

DATE DRILLED: 11/20/97

DRILLING COMPANY: Precision Sampling Co.

SURFACE ELEVATION: *Feet*

DRILLING METHOD: Direct Push (DPP)

BORING DIAMETER: 3 Inches

DRILLING RIG: 50-2

GEOLOGIST: Gerald Goode

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered PID (ppm)		B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	unfiltered							
5	SS-1	6wb	no/no						SP	<p>Sand, light brown to yellowish orange, fine to medium grained, organic matter and roots, trace of fines, wet at 4' bls</p> <p>Sandy Clay, reddish brown, mottled dark red, light brown, and gray medium stiff, slightly plastic, dry (Occasional clayey sand seam)</p> <p>Clayey Sand, reddish brown, fine to medium grained, plastic fines, dry (Occasional sandy clay seam)</p> <p>End of Boring</p>	
	SS-2	6wb	no/no								
	SS-3	DP	no/no						CL		
10	SS-4		no/no	no		na					
	SS-5		no/no						SL		
15	6		no/no								



SOUTHNAVFAC

LOG OF BORING

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PROJECT NO: CTO 0037

PROJECT LOCATION: NAS Whiting Field

PROJECT NAME: Product Line (Dispenser Island) Investigation

DRILLING COMPANY: Precision Sampling Inc.

DATE DRILLED: 11/20/97

DRILLING METHOD: Direct Push (DP)

SURFACE ELEVATION: Feet

DRILLING RIG: SO-2

BORING DIAMETER: 3 Inches

GEOLOGIST: Gerald Goode

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered PID (ppm) unfiltered				GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
5	SS-1	6.0b	NO/NO						Sand, light brown to yellowish orange, fine to medium grained, trace of fines, wet at 4' b/s	
	SS-2	6.0b	NO/NO					SP		
	SS-3	DP	NO/NO						Sandy Clay, reddish brown, mottled dark red, light brown, and gray, medium stiff, slightly plastic, dry	
	SS-4		NO/NO					CL		
10	SS-5		NO/NO	NO		NO				
	SS-6		NO/NO							
15			NO/NO						End of Boring	
20										
25										
30										
35										
40										



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PROJECT NO: CTO 0037

PROJECT LOCATION: NAS Whiting Field

DRILLING COMPANY: Precision Sampling Inc.

DRILLING METHOD: Direct Push (DPP)

DRILLING RIG: 50-2

PROJECT NAME: Product line (Dispenser Island) Investigation
DATE DRILLED: 11/1/13

DATE DRILLED: 11/20/97

SURFACE ELEVATION: *Feet*

BORING DIAMETER: 3 Inches

GEOLOGIST: Gerald Goode

[illegible]



LOG OF BORING

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SBOS

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PROJECT NO: CTO 0037

PROJECT NAME: Product line (Dispenser Island) Investigation

DATE DRILLED: 11/20/97

JECT LOCATION: NAS Whiting Field

ING COMPANY: Precision Sampling Inc.

SURFACE ELEVATION: *Feet*

DRILLING METHOD: Direct Push (DPP)

BORING DIAMETER: 3 Inches

DRILLING RIG: 50-2

GEOLOGIST: Gerald Goode

GEOLOGIST: Gerald Goode											
DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtering		B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			PID (rpm)	unfiltered							
	SS-1	6.0	NO/NO						SP	Sand, light brown to yellowish orange, fine to medium grained, trace of organics and fines, wet at 4' bls	
	SS-2	6.0	NO/NO								
5	SS-3	DP	NO/NO								
	SS-4		NO/NO	NO		NO		CL	Sandy Clay, reddish brown, mottled dark red, gray, and light brown, medium stiff, dry (Clayey Sand Seams, fine to medium grained with trace of coarse grains)		
10	SS-5		NO/NO								
	SS-6		NO/NO					SC	Clayey Sand, reddish brown, fine to medium grained, slightly plastic, dry		
										End of Boring	
20											
25											
30											
35											
40											
45											
50											
55											
60											
65											
70											
75											
80											
85											
90											
95											
100											

PROJECT NO: CTO 0037

PROJECT NAME: Product line (Dispenser Island) Investigation

PROJECT LOCATION: NAS Whiting Field

DATE DRILLED: 11/20/97

DRILLING COMPANY: Precision Sampling Inc.

SURFACE ELEVATION: *Feet*

DRILLING METHOD: Direct Push (DP)

BORING DIAMETER: 3 Inches

DRILLING RIG: 50-2

Gerald Goode

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered PTD (ppm)		GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone				
	SS-1	6mb	no/no			SP	Sand, light brown to yellowish Orange, fine to medium grained, trace of organics and Finos, wet at 4' bts	
	SS-2	6mb	no/no					
5	SS-3	↑ DP	10/100			CL	Sandy Clay and Clayey Sand, mottled dark red and light brown (fuel staining - gray and fuel like odors from 7 to 10' bts) medium sh. ss, dry	
	SS-4		90/400 no	no				
10	SS-5		20/300					
	SS-6		20/50					
	SS-7		15/50 no	no			clayey Sand, light pink, fine grained, plastic Finos, dry	
20	SS-8		no/5			Sc		
	SS-9		no/no					
25		↓					End of Boring	
30								
35								
40								



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PROJECT NAME: Product line (Dispenser Island) Investigation

DATE DRILLED: 11/21/97

JECT LOCATION: NAS Whiting Field

DRILLING COMPANY: Precision Sampling Inc.

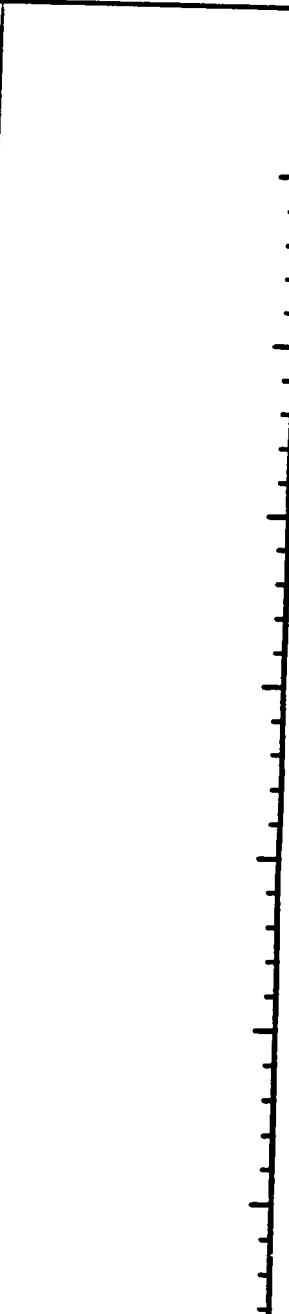
SURFACE ELEVATION: Feet

DRILLING METHOD: Direct Push (DP)

BORING DIAMETER: 3 Inches

DRILLING RIG: 50-2

GEOLOGIST: Gerald Goode

GEOLOGIST: Gerald Goode											
DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered PID (ppm)		B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	unfiltered							
	SS-1	6ub	NO/NO						SP	Sand, light brown to yellowish Orange, fine to medium grained, trace of organics/roots, trace of fines, dry	
	SS-2	6ub	NO/NO								
5	SS-3	DP	NO/NO								
	SS-4		NO/NO					CL	Sandy clay, reddish brown, mottled dark red, light brown, and gray medium stiff, slightly plastic, (Trace of coarse grained sand from 7 to 8' bls) dry		
10	SS-5		NO/NO	NO		NO					
	SS-6		NO/NO					CL SC	Some clayey sand seems. Fine to medium grained, slightly plastic between 12 and 16' bls End of Boring		



LOG OF BORING

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PROJECT NO: CTO 0037

JECT LOCATION: *NAS Whiting Field*

PROJECT NAME: Product Line (Dispenser Island) Investigation

DATE DRILLED: 11/21/97

DRILLING COMPANY: Precision Sampling Inc

SURFACE ELEVATION: *Feet*

DRILLING METHOD: Direct Push (CPT)

BORING DIAMETER: 3 Inches

DRILLING RIG: 50-2

GEOLOGIST: Gerald Goode

[illegible]



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PROJECT NAME: Product Line (Dispenser Island) Investigation

DATE DRILLED: 11/21/97

SURFACE ELEVATION: *Feet*

BORING DIAMETER: 3 Inches

GEOLOGIST: Gerald Goode

[illegible]



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PROJECT NO: CTO 0037

PROJECT NAME: Product line (Dispenser Island) Investigation
DATE ORILED: 11/10/1977

JECT LOCATION: NAS Whiting Field

DATE DRILLED: 11/21/97

DRILLING COMPANY: Precision Sampling Inc.

SURFACE ELEVATION: *Feet*

DRILLING METHOD: Direct Push (DPP)

BORING DIAMETER: 3 Inches

DRILLING RIG: 50-2

GEOLOGIST: Gerald Goode

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered PI (rpm)		B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	unfiltered							
5	SS-1	Grb	ND/ND							Asphalt surface to 4" bls	
	SS-2	Grb	ND/ND						SP	Sand, light brown to yellowish orange, fine to medium grained, trace of finer, moist	
	SS-3	DP	ND/ND								
10	SS-4		ND/ND		ND		ND		CC	Sandy clay reddish brown, mottled light brown to gray, medium stiff, slightly plastic, dry	
	SS-5		ND/ND								
	6		ND/ND							End of Boring	



LOG OF BORING ^{PDF-}SB72

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PROJECT NO: CTO 0037

PROJECT LOCATION: NAS Whiting Field

DRILLING COMPANY: Precision Sampling T-

DRILLING METHOD: Direct Push (DP)

DRILLING RIG: 50-2

PROJECT NAME: Product line (Dispenser Island) Investigation.
DATE DRILLED: 11-1-1988

DATE DRILLED: 11/21/97

SURFACE ELEVATION: *Feet*

BORING DIAMETER: 3 Inches

GEOLOGIST: Gerald Goode

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered (ppm)		B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	unfiltered							
SS-1	Grab	ND/ND								Concrete surface to 8" bls	
SS-2	Grab	ND/ND							SP	Sand, fine to medium grained, trace of fines, dry	
5	SS-3	↑									
	DP	45/400									
10	SS-4		20/400	ND		ND			CL	Sandy Clay, reddish brown, mottled light gray and light brown, stiff, slightly plastic Fuel stains from 5 to 8' bls Fuel like odors from 5 to 10' bls	
	SS-5		ND/ND								
15	SS-6	↓	ND/ND						SL	Clayey Sand, reddish brown, fine to medium grained, slightly plastic fines, dry	
0										End of Boring	



SOUTHNAVFAC

LOG OF BORING

PPS-
SB-01

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PROJECT NO: CTO 0037

7648

PROJECT NAME: Product line (SP-5 Pump House) Investigation

PROJECT LOCATION: NAS Whiting Field

DATE DRILLED: 11/23/97

DRILLING COMPANY: Precision Sampling Inc.

SURFACE ELEVATION: Feet

DRILLING METHOD: Direct Push (DP)

BORING DIAMETER: 3 Inches

DRILLING RIG: SD-2

GEOLOGIST: Gerald Gonde

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtrate (ppm) unfiltered				GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
5	SS-1	6.0	ND/ND						Silty Sand, yellowish orange, fine grained, plastic fines, moist	
	SS-2	6.0	ND/2000					SM	Silty Sand, light brown, fine grained, plastic fines, fuel like odor (slight odor) and staining, wet from 4 to 5' blc	
	SS-3	(DP)	ND/100	ND		ND				
10	SS-4		ND/250					CL/CH	Sandy clay and clay, reddish brown mottled dark red (clay unit is light gray, medium stiff, plastic) medium stiff, plastic, moist	
	SS-5		ND/50	ND		ND		SC	Clayey Sand, yellowish orange and red, fine to medium grained, (slight fuel like odor and stains), plastic fines, dry	
	SS-6		ND/10					SP	Sand, white, fine to medium grained, trace of dark minerals and fines, dry	
20	SS-7		ND/ND						Sand, white, fine to coarse grained trace of dark minerals and fines, dry	



LOG OF BORING ^{PPS-}SB02

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PROJECT NO: CTO 0037

7648

PROJECT NAME: Hot duct line (JP-5 Pump House) Investigation
DATE DRILLED: 11/23/97

PROJECT LOCATION: NAS Whiting Field

DATE DRILLED: 11/23/97

DRILLING COMPANY: Precision Sampling Inc.

SURFACE ELEVATION: *Feet*

DRILLING METHOD: Direct Push (DP)

BORING DIAMETER: 3 Inches

DRILLING RIG:

50-2

GEOLOGIST: Gerald Good

GEOLOGIST: Gerald Gonde											
DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered (ppm)		B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	Unfiltered							
	SS-1	Grb	no/no							Silly Sand, yellowish orange, Fine grained, plastic Fines, moist	
	SS-2	Grb	no/no						SM	silly Sand, light brown Fine grained, wet from 4 to 5' bls	
5	SS-3	DP	no/no	ND			ND				
	SS-4		no/no						SC	clayey Sand, reddish brown to light brown, Fine grained, plastic Fines, moist	
10	SS-5		no/no						CL	Sandy Clay and Clay, reddish brown, mottled dark red, medium stiff, plastic Fines, (Clay unit is light gray, medium stiff and slightly plastic) moist	
	SS-6		no/no	ND			ND		CH		
15			no/no						SP	Sand, white and reddish brown, Fine to medium grained, trace of Fines, moist	
20										End of Boring	
25											
30											
35											
40											



PPS-

SB-03

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PROJECT NO: CTO 0037

7648

PROJECT NAME: Direct line (SP-5 Pump House) Investigation
DATE DRILLED: 11/22/97

DATE DRILLED: 11/23/97

DRILLING COMPANY: Precision Drilling Co.

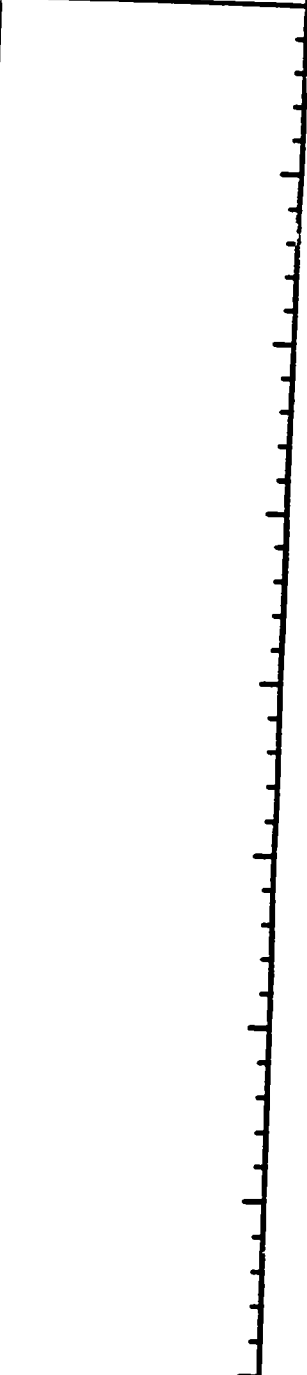
SURFACE ELEVATION: *Feet*

DRILLING METHOD: Direct Push / Sampling

BORING DIAMETER: 3 Inches

DRILLING RIG: SP-2

GEOLOGIST: Gerald Good-

GEOLOGIST: Gerald Goode											
DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtrate (ppm)		B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	unfiltered							
	SS-1	6rb	ND/ND						sm	Silty Sand, yellowish orange, Fine grained	
	SS-2	6rb	ND/ND						sc	Clayey Sand, reddish brown, Fine grained, plastic Fines, wet from 4 to 5' bls	
5	SS-3	DP	ND/ND	ND		ND					
	SS-4		ND/ND					cl	Sandy Clay, reddish brown, mottled dark red, medium stiff, slightly plastic, moist		
10	SS-5		ND/ND					ch	Clay, light gray, mottled light brown and dark red, medium stiff, moist		
	.6		ND/ND								
								sp	Sand, white and reddish brown, fine to medium grained, plastic fines, dry		
20										Sand white fine to medium grained, trace of dark minerals and fines, dry	
										End of Boring	
25											
30											
15											



LOG OF BORING

PPS-
SB04

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PROJECT NO: CTO 0037

7648

PROJECT LOCATION: NAS Whiting Field

PROJECT NAME: Product line (IP-5 Pump Horse) Investigation
DATE DRILLED: 11/23/97

DATE DRILLED: 11/23/97

DRILLING COMPANY: Precision Sampling Inc.
DRILLING METHOD: Q

SURFACE ELEVATION: *Feet*

DRILLING METHOD: Direct Push (DP)

BORING DIAMETER: 3 Inches

DRILLING RIG: 50-2

GEOLOGIST: Gerald Goode

GEOLOGIST: Gerald Gende											
DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtered (ppm)		B. Zone	Borehole	Drill B. Z.	GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	unfiltered							
	SS-1	Grab	no/no							Sand, light brown, fine to medium grained, trace of fines, wet from 4 to 5' bls	
	SS-2	Grab	no/no						SP		
5	SS-3	DP	no/no						SC		
	SS-4		no/no								
10	SS-5		no/no	no		no			CL		
	SS-6		no/no								
15	SS-7		no/no						SC		
			no/no						CH		
20									SP	Sand, white, fine to medium grained, trace of dark minerals, trace of fines, dry	
25											
										End of Boring	
30											
15											
0											



SOUTHNAVFAC

LOG OF BORING ^{PPS -} SB05

Page 1 of 1

PROJECT NO: CTO 0037

7648

PROJECT NAME: Product line (SP-5 Pump House) Investigation

PROJECT LOCATION: NAS Whiting Field

DATE DRILLED:

DRILLING COMPANY: Precision Sampling Inc.

SURFACE ELEVATION: Feet

DRILLING METHOD: Direct Push (DP)

BORING DIAMETER: 3 Inches

DRILLING RIG: SP-2

GEOLOGIST: Gerald Gonde

GEOLOGIST: Gerald Gende										
DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	Filtrate (ppm) Unfiltered				GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
	SS-1	Grb	ND/ND						SP Sand, light brown, Fine to medium grained, trace of organics and root fragments, trace of fines, wet from 4 to 5' bls	
	SS-2	Grb	ND/ND							
5	SS-3	DP	ND/ND						SC Clayey Sand, light brown to yellowish orange, fine to medium grained, plastic fines, moist	
	SS-4		ND/ND	NO		NO			CL Sandy Clay, reddish brown mottled dark red, gray, and light brown, medium stiff, slightly plastic, moist	
10	SS-5		ND/ND						CH Clay, gray, medium stiff, highly plastic	
15	SS-6		ND/ND						SP Sand, white, Fine to medium grained, trace of dark minerals and fines, dry	
	SS-7		ND/ND							
20										
25										
30										
35										

APPENDIX F

HEADSPACE METHODOLOGY FOR DETERMINING SOIL ORGANIC VAPOR CONCENTRATIONS

HEADSPACE METHODOLOGY FOR DETERMINING SOIL ORGANIC VAPOR CONCENTRATION

Soil headspace readings were obtained utilizing the following method which conforms to the requirements of Rule 62-770.200(2), FAC.

Two 16 ounce glass soil jars were half-filled with soil sample (duplicate samples). The soil jars were then sealed utilizing "mason jar" type open top screw on caps with foil in place of the conventional solid jar tops. The soil samples were allowed to equilibrate to ambient temperature which was within the FDEP temperature range.

The samples were tested with a Foxboro Century 128, an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID). Prior to each days activities, the OVA was field calibrated with 100 ppm methane in air, in accordance with the manufacturers specifications. Sample testing was performed by inserting the OVA probe through the foil sample cover and recording the highest OVA reading. Following collection of this OVA reading, the OVA was fitted with a granular activated carbon filter probe. The OVA was then used to test the headspace above the duplicate sample. Carbon absorbs petroleum hydrocarbons and thus the filtered reading is assumed to represent naturally occurring organic vapors.

Upon completion of the screening exercise, the carbon filtered result was subtracted from the un-filtered result, to obtain a net petroleum vapor value. In accordance with Rule 17(62)-770.200(2), FAC, and Guidelines for Assessment and Remediation of Petroleum Contaminated Soil (May 1994) corrected headspace levels in excess of 50 ppm is defined as "excessively contaminated soil" for diesel contaminated soil. Corrected headspace levels in excess of 10 ppm but less than 50 ppm are considered as contaminated, though not excessively contaminated.

APPENDIX G

PRE-BURN SOIL LABORATORY DATA SHEETS

Quanterra Incorporated
5910 Breckenridge Parkway, Suite H
Tampa, Florida 33610

813 621-0784 Telephone
813 623-6021 Fax

ANALYTICAL REPORT

PROJECT NO. 7648

(NAS) Whiting Field

Lot #: B8B110133

Paul Calligan

QUANTERRA INCORPORATED

Certification Numbers: E84059, HRS84297
FDEP CompQAP: 870270G



Nancy Robertson
Project Manager

February 19, 1998

		<u>MDL</u>	<u>Reporting Limit</u>	
FL-DEP FL-PRO				
Total Petroleum Hydrocarbons	Q743	3.5 mg/kg	10.0 mg/kg	
SW846 6010A				
Arsenic	7440-38-2	0.013 mg/L	5.0 mg/L	TCLP(1311) -> METALS, TO
Barium	7440-39-3	0.001 mg/L	100.0 mg/L	TCLP(1311) -> METALS, TO
Cadmium	7440-43-9	0.0029 mg/L	1.0 mg/L	TCLP(1311) -> METALS, TO
Chromium, Total	7440-47-3	0.002 mg/L	5.0 mg/L	TCLP(1311) -> METALS, TO
Copper	7440-50-8	1.0 mg/L	1.0 mg/L	TCLP(1311) -> METALS, TO
Lead	7439-92-1	0.014 mg/L	5.0 mg/L	TCLP(1311) -> METALS, TO
Nickel	7440-02-0	2.0 mg/L	2.0 mg/L	TCLP(1311) -> METALS, TO
Selenium	7782-49-2	0.069 mg/L	1.0 mg/L	TCLP(1311) -> METALS, TO
Silver	7440-22-4	0.0038 mg/L	5.0 mg/L	TCLP(1311) -> METALS, TO
Zinc	7440-66-6	1.0 mg/L	1.0 mg/L	TCLP(1311) -> METALS, TO
Arsenic	7440-38-2	0.0029 mg/L	1.0 mg/L	Trace ICP
Copper	7440-50-8	0.0025 mg/L	1.0 mg/L	SPLP-W(1312) -> METALS, T
Zinc	7440-66-6	0.012 mg/L	2.0 mg/L	SPLP-W(1312) -> METALS, T
Aluminum	7429-90-5	1.3 mg/kg	10.0 mg/kg	
Antimony	7440-36-0	0.097 mg/kg	0.5 mg/kg	Trace ICP
Antimony	7440-36-0	0.65 mg/kg	6.0 mg/kg	
Arsenic	7440-38-2	0.12 mg/kg	0.25 mg/kg	Trace ICP
Arsenic	7440-38-2	0.55 mg/kg	25.0 mg/kg	
Barium	7440-39-3	0.048 mg/kg	5.0 mg/kg	
Beryllium	7440-41-7	0.05 mg/kg	0.5 mg/kg	
Cadmium	7440-43-9	0.05 mg/kg	0.5 mg/kg	
Calcium	7440-70-2	2.9 mg/kg	100.0 mg/kg	
Chromium, Total	7440-47-3	0.085 mg/kg	1.0 mg/kg	
Cobalt	7440-48-4	0.52 mg/kg	2.5 mg/kg	
Copper	7440-50-8	0.37 mg/kg	2.5 mg/kg	
Iron	7439-89-6	1.1 mg/kg	5.0 mg/kg	
Lead	7439-92-1	0.079 mg/kg	0.25 mg/kg	Trace ICP
Lead	7439-92-1	0.4 mg/kg	2.5 mg/kg	
Magnesium	7439-95-4	1.1 mg/kg	100.0 mg/kg	
Manganese	7439-96-5	0.068 mg/kg	1.0 mg/kg	
Molybdenum	7439-98-7	0.1 mg/kg	5.0 mg/kg	
Nickel	7440-02-0	0.4 mg/kg	2.5 mg/kg	
Potassium	7440-09-7	13.0 mg/kg	100.0 mg/kg	
Selenium	7782-49-2	0.16 mg/kg	0.25 mg/kg	Trace ICP
Selenium	7782-49-2	2.4 mg/kg	25.0 mg/kg	
Silver	7440-22-4	0.14 mg/kg	1.0 mg/kg	
Sodium	7440-23-5	1.1 mg/kg	100.0 mg/kg	
Strontium	7440-24-6	0.1 mg/kg	5.0 mg/kg	
Thallium	7440-28-0	1.3 mg/kg	5.0 mg/kg	
Thallium	7440-28-0	0.21 mg/kg	0.5 mg/kg	Trace ICP
Tin	7440-31-5	0.57 mg/kg	5.0 mg/kg	
Titanium	7440-32-6	0.093 mg/kg	5.0 mg/kg	
Vanadium	7440-62-2	0.099 mg/kg	2.5 mg/kg	
Zinc	7440-66-6	1.4 mg/kg	2.0 mg/kg	
SW846 7471A				
Mercury	7439-97-6	0.0058 mg/kg	0.1 mg/kg	
SW846 8010B				
Benzyl chloride	100-44-7	1.2 ug/kg	5.0 ug/kg	
Bromobenzene	108-86-1	1.1 ug/kg	2.0 ug/kg	

		<u>MDL</u>	<u>Reporting Limit</u>	
Bromodichloromethane	75-27-4	1.0 ug/kg	2.0 ug/kg	
Bromoform	75-25-2	0.65 ug/kg	2.0 ug/kg	
Bromomethane	74-83-9	0.73 ug/kg	2.0 ug/kg	
Carbon tetrachloride	56-23-5	0.68 ug/kg	2.0 ug/kg	
Chlorobenzene	108-90-7	0.67 ug/kg	2.0 ug/kg	
Chloroethane	75-00-3	0.68 ug/kg	2.0 ug/kg	
2-Chloroethyl vinyl ether	110-75-8	0.77 ug/kg	5.0 ug/kg	
Chloroform	67-66-3	0.95 ug/kg	2.0 ug/kg	
Chloromethane	74-87-3	0.91 ug/kg	2.0 ug/kg	
Chlorodibromomethane	124-48-1	0.82 ug/kg	2.0 ug/kg	
Dibromomethane	74-95-3	0.71 ug/kg	2.0 ug/kg	
1,2-Dichlorobenzene	95-50-1	1.0 ug/kg	2.0 ug/kg	
1,3-Dichlorobenzene	541-73-1	1.0 ug/kg	2.0 ug/kg	
1,4-Dichlorobenzene	106-46-7	1.1 ug/kg	2.0 ug/kg	
Dichlorodifluoromethane	75-71-8	0.66 ug/kg	2.0 ug/kg	
1,1-Dichloroethane	75-34-3	0.74 ug/kg	2.0 ug/kg	
1,2-Dichloroethane	107-06-2	0.85 ug/kg	2.0 ug/kg	
1,1-Dichloroethene	75-35-4	0.71 ug/kg	2.0 ug/kg	
cis-1,2-Dichloroethene	156-59-2	0.9 ug/kg	2.0 ug/kg	
trans-1,2-Dichloroethene	156-60-5	0.67 ug/kg	2.0 ug/kg	
Methylene Chloride	75-09-2	0.83 ug/kg	5.0 ug/kg	
1,2-Dichloropropane	78-87-5	0.9 ug/kg	2.0 ug/kg	
cis-1,3-Dichloropropene	10061-01-5	0.8 ug/kg	2.0 ug/kg	
trans-1,3-Dichloropropene	10061-02-6	0.74 ug/kg	2.0 ug/kg	
Methylene chloride	75-09-2	0.83 ug/kg	5.0 ug/kg	
1,1,1,2-Tetrachloroethane	630-20-6	0.47 ug/kg	2.0 ug/kg	
1,1,2,2-Tetrachloroethane	79-34-5	0.73 ug/kg	2.0 ug/kg	
Tetrachloroethene	127-18-4	0.75 ug/kg	2.0 ug/kg	
1,1,1-Trichloroethane	71-55-6	0.87 ug/kg	2.0 ug/kg	
1,1,2-Trichloroethane	79-00-5	0.83 ug/kg	2.0 ug/kg	
Trichloroethene	79-01-6	0.76 ug/kg	2.0 ug/kg	
Fluorotrichloromethane	75-69-4	0.62 ug/kg	2.0 ug/kg	
1,2,3-Trichloropropane	96-18-4	0.69 ug/kg	2.0 ug/kg	
Vinyl chloride	75-01-4	0.61 ug/kg	2.0 ug/kg	
SW846 8020A				
Benzene	71-43-2	0.58 ug/kg	2.0 ug/kg	
Chlorobenzene	108-90-7	0.89 ug/kg	2.0 ug/kg	
1,2-Dichlorobenzene	95-50-1	1.0 ug/kg	2.0 ug/kg	
1,3-Dichlorobenzene	541-73-1	0.92 ug/kg	2.0 ug/kg	
1,4-Dichlorobenzene	106-46-7	0.95 ug/kg	2.0 ug/kg	
Ethylbenzene	100-41-4	0.45 ug/kg	2.0 ug/kg	
Methyl tert-butyl ether	1634-04-4	1.1 ug/kg	2.0 ug/kg	
Naphthalene	91-20-3	2.1 ug/kg	5.0 ug/kg	
Toluene	108-88-3	0.43 ug/kg	2.0 ug/kg	
m-Xylene & p-Xylene	136777-61-2	0.87 ug/kg	2.0 ug/kg	
o-Xylene	95-47-6	0.47 ug/kg	2.0 ug/kg	
Xylenes, Total	1330-20-7	0.47 ug/kg	2.0 ug/kg	
SW846 8310				
Acenaphthene	83-32-9	0.32 ug/L	1.0 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Acenaphthylene	208-96-8	0.38 ug/L	1.0 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Anthracene	120-12-7	0.21 ug/L	1.0 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Benzo[a]anthracene	56-55-3	0.035 ug/L	0.2 ug/L	SPLP-W(1312) -> LIQ/LIQ, C

		<u>MDL</u>	<u>Reporting Limit</u>	
Benzo[b]fluoranthene	205-99-2	0.079 ug/L	0.2 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Benzo[k]fluoranthene	207-08-9	0.043 ug/L	0.2 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Benzo[g,h,i]perylene	191-24-2	0.1 ug/L	0.2 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Benzo[a]pyrene	50-32-8	0.04 ug/L	0.2 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Chrysene	218-01-9	0.034 ug/L	0.2 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Dibenz(a,h)anthracene	53-70-3	0.11 ug/L	0.2 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Fluoranthene	206-44-0	0.053 ug/L	0.2 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Fluorene	86-73-7	0.82 ug/L	2.0 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Indeno[1,2,3-cd]pyrene	193-39-5	0.014 ug/L	0.2 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
2-Methylnaphthalene	91-57-6	0.39 ug/L	1.0 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
1-Methylnaphthalene	90-12-0	0.38 ug/L	1.0 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Naphthalene	91-20-3	0.41 ug/L	1.0 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Phenanthrene	85-01-8	0.27 ug/L	1.0 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Pyrene	129-00-0	0.068 ug/L	0.2 ug/L	SPLP-W(1312) -> LIQ/LIQ, C
Acenaphthene	83-32-9	13.0 ug/kg	50.0 ug/kg	
Acenaphthylene	208-96-8	17.0 ug/kg	50.0 ug/kg	
Anthracene	120-12-7	11.0 ug/kg	50.0 ug/kg	
Benzo[a]anthracene	56-55-3	1.3 ug/kg	5.0 ug/kg	
Benzo[a]anthracene	56-55-3	1.3 ug/kg	5.0 ug/kg	
Benzo[b]fluoranthene	205-99-2	1.7 ug/kg	5.0 ug/kg	
Benzo[k]fluoranthene	207-08-9	1.1 ug/kg	5.0 ug/kg	
Benzo[g,h,i]perylene	191-24-2	1.9 ug/kg	5.0 ug/kg	
Benzo[a]pyrene	50-32-8	1.3 ug/kg	5.0 ug/kg	
Chrysene	218-01-9	1.0 ug/kg	5.0 ug/kg	
Dibenz(a,h)anthracene	53-70-3	3.1 ug/kg	5.0 ug/kg	
Fluoranthene	206-44-0	2.9 ug/kg	5.0 ug/kg	
Fluorene	86-73-7	17.0 ug/kg	50.0 ug/kg	
Indeno[1,2,3-cd]pyrene	193-39-5	1.0 ug/kg	5.0 ug/kg	
2-Methylnaphthalene	91-57-6	1.2 ug/kg	50.0 ug/kg	
1-Methylnaphthalene	90-12-0	14.0 ug/kg	50.0 ug/kg	
Naphthalene	91-20-3	14.0 ug/kg	50.0 ug/kg	
Phenanthrene	85-01-8	12.0 ug/kg	50.0 ug/kg	
Pyrene	129-00-0	2.3 ug/kg	5.0 ug/kg	

CASE NARRATIVE

LABORATORY ID NUMBER: B8B110133

ORGANICS -INORGANICS

The Method blank associated with batch numbers 8049184 and 8049187 for method 601 and 602 had several compounds flagged with the "J" value which indicates estimated results below the reporting limit.

The recovery and RPD for FL-Pro, associated with QC batch number 8043180 in the matrix spike/matrix spike duplicate was not calculated because the sample amount was greater than four times the spike amount. This is flagged with MSB.

Due to suspected matrix interference and or dissimilar nature of the sample aliquots, several metals in the matrix spike/matrix spike duplicate associated with QC batch numbers 8044177 and 8044182 were outside the laboratory established control limits. The Laboratory Control Sample indicated acceptable method performance for each batch.

Due to suspected matrix interference and or dissimilar nature of the sample aliquots, Methylene chloride in the matrix spike/matrix spike duplicate associated with QC batch number 8049184 was outside the laboratory established control limits. The Laboratory Control Sample indicated acceptable method performance for the batch.

Due to suspected matrix interference and or dissimilar nature of the sample aliquots, EDB and TPH in the matrix spike duplicate associated with QC batch numbers 8043146 and 8043188 were outside the laboratory established control limits. The Laboratory Control Sample indicated acceptable method performance for each batch.

Due to suspected matrix interference and or dissimilar nature of the sample aliquots, several compounds in the matrix spike/matrix spike duplicate associated with QC batch number 8043186 was outside the laboratory established control limits. The Laboratory Control Sample indicated acceptable method performance for the batch.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PREBURN

GC Volatiles

Lot-Sample #....: B8B110133-001	Work Order #....: CFA1E101	Matrix.....: SOLID
Date Sampled....: 02/10/98	Date Received...: 02/11/98	
Prep Date.....: 02/17/98	Analysis Date...: 02/18/98	
Prep Batch #....: 8049197		
Dilution Factor: 1	Initial Wgt/Vol: 100 uL	Final Wgt/Vol...: 5 mL
% Moisture.....: 9.1		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Bromobenzene	ND	0.27	mg/kg	SW846 8010B
Bromodichloromethane	ND	0.27	mg/kg	SW846 8010B
Bromoform	ND	0.27	mg/kg	SW846 8010B
Bromomethane	ND	0.27	mg/kg	SW846 8010B
Carbon tetrachloride	ND	0.27	mg/kg	SW846 8010B
Chlorobenzene	ND	0.27	mg/kg	SW846 8010B
Dibromochloromethane	ND	0.27	mg/kg	SW846 8010B
Chloroethane	ND	0.27	mg/kg	SW846 8010B
2-Chloroethyl vinyl ether	ND	0.69	mg/kg	SW846 8010B
Chloroform	ND	0.27	mg/kg	SW846 8010B
Chloromethane	ND	0.27	mg/kg	SW846 8010B
Dibromomethane	ND	0.27	mg/kg	SW846 8010B
1,2-Dichlorobenzene	ND	0.27	mg/kg	SW846 8010B
1,3-Dichlorobenzene	ND	0.27	mg/kg	SW846 8010B
1,4-Dichlorobenzene	ND	0.27	mg/kg	SW846 8010B
Dichlorodifluoromethane	ND	0.27	mg/kg	SW846 8010B
1,1-Dichloroethane	ND	0.27	mg/kg	SW846 8010B
1,2-Dichloroethane	ND	0.27	mg/kg	SW846 8010B
1,1-Dichloroethene	ND	0.27	mg/kg	SW846 8010B
trans-1,2-Dichloroethene	ND	0.27	mg/kg	SW846 8010B
1,2-Dichloropropane	ND	0.27	mg/kg	SW846 8010B
cis-1,3-Dichloropropene	ND	0.27	mg/kg	SW846 8010B
trans-1,3-Dichloropropene	ND	0.27	mg/kg	SW846 8010B
Trichlorofluoromethane	ND	0.27	mg/kg	SW846 8010B
1,1,1,2-Tetrachloroethane	ND	0.27	mg/kg	SW846 8010B
1,1,2,2-Tetrachloroethane	ND	0.27	mg/kg	SW846 8010B
Tetrachloroethene	ND	0.27	mg/kg	SW846 8010B
1,1,1-Trichloroethane	ND	0.27	mg/kg	SW846 8010B
1,1,2-Trichloroethane	ND	0.27	mg/kg	SW846 8010B
Trichloroethene	ND	0.27	mg/kg	SW846 8010B
1,2,3-Trichloropropane	ND	0.27	mg/kg	SW846 8010B
Vinyl chloride	ND	0.27	mg/kg	SW846 8010B
Methylene chloride	ND	0.69	mg/kg	SW846 8010B
cis-1,2-Dichloroethene	ND	0.27	mg/kg	SW846 8010B
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS		
4-Bromofluorobenzene	86	(70 - 130)		

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.
Elevated reporting limits due to matrix interference.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PREBURN

GC Volatiles

Lot-Sample #....: B8B110133-001	Work Order #....: CFA1E102	Matrix.....: SOLID
Date Sampled....: 02/10/98	Date Received...: 02/11/98	
Prep Date.....: 02/17/98	Analysis Date...: 02/18/98	
Prep Batch #....: 8049198		
Dilution Factor: 1	Initial Wgt/Vol: 100 uL	Final Wgt/Vol...: 5 mL
% Moisture.....: 9.1		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Methyl tert-butyl ether	0.11 J	0.27	mg/kg	SW846 8020A
Benzene	ND	0.27	mg/kg	SW846 8020A
Ethylbenzene	1.6	0.27	mg/kg	SW846 8020A
Toluene	ND	0.27	mg/kg	SW846 8020A
Chlorobenzene	ND	0.27	mg/kg	SW846 8020A
1,2-Dichlorobenzene	ND	0.27	mg/kg	SW846 8020A
1,3-Dichlorobenzene	ND	0.27	mg/kg	SW846 8020A
1,4-Dichlorobenzene	ND	0.27	mg/kg	SW846 8020A
Xylenes (total)	3.6	0.27	mg/kg	SW846 8020A
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS		
4-Bromofluorobenzene	91	(70 - 130)		

NOTE(S) :

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight.

Elevated reporting limits due to matrix interference.



Environmental
Services

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PREBURN

GC Semivolatiles

Lot-Sample #....: B8B110133-001 Work Order #....: CFA1E104 Matrix.....: SOLID
Date Sampled....: 02/10/98 Date Received...: 02/11/98
Prep Date.....: 02/12/98 Analysis Date...: 02/13/98
Prep Batch #....: 8043180
Dilution Factor: 1 Initial Wgt/Vol: 30 g Final Wgt/Vol...: 2 mL
% Moisture.....: 9.1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
TPH (C8-C40)	480	11	mg/kg	FL-DEP FL-PRO
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS		
o-Terphenyl	94	(22 - 166)		
Nonatriacontane	94	(10 - 192)		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.



Environmental
Services

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PREBURN

HPLC

Lot-Sample #....: B8B110133-001
Date Sampled....: 02/10/98
Prep Date.....: 02/12/98
Prep Batch #....: 8043179
Dilution Factor: 1
% Moisture.....: 9.1

Work Order #....: CFA1E103
Date Received...: 02/11/98
Analysis Date...: 02/17/98

Matrix.....: SOLID

Initial Wgt/Vol: 30 g

Final Wgt/Vol...: 1 mL

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Acenaphthene	ND	55	ug/kg	SW846 8310
Acenaphthylene	ND	55	ug/kg	SW846 8310
Anthracene	ND	55	ug/kg	SW846 8310
Benzo (a) anthracene	4.4 J	5.5	ug/kg	SW846 8310
Benzo (a) pyrene	ND	5.5	ug/kg	SW846 8310
Benzo (b) fluoranthene	ND	5.5	ug/kg	SW846 8310
Benzo (ghi) perylene	8.1	5.5	ug/kg	SW846 8310
Benzo (k) fluoranthene	ND	5.5	ug/kg	SW846 8310
Chrysene	ND	5.5	ug/kg	SW846 8310
Dibenz (a,h) anthracene	ND	5.5	ug/kg	SW846 8310
Fluoranthene	ND	5.5	ug/kg	SW846 8310
Fluorene	ND	55	ug/kg	SW846 8310
Indeno (1,2,3-cd) pyrene	2.0 J	5.5	ug/kg	SW846 8310
1-Methylnaphthalene	170	55	ug/kg	SW846 8310
2-Methylnaphthalene	270	55	ug/kg	SW846 8310
Naphthalene	60	55	ug/kg	SW846 8310
Phenanthrene	ND	55	ug/kg	SW846 8310
Pyrene	ND	5.5	ug/kg	SW846 8310
SURROGATE	PERCENT	RECOVERY		
Carbazole	RECOVERY	LIMITS		
	60	(30 - 130)		

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

Client Sample ID: PREBURN

TOTAL Metals

Lot-Sample #...: B8B110133-001

Date Sampled...: 02/10/98

% Moisture...: 9.1

Date Received...: 02/11/98

Matrix...: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 8044177						
Mercury	0.021 B	0.11	mg/kg	SW846 7471A	02/13/98	CFA1E10D
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Prep Batch #...: 8044182						
Arsenic	1.2	0.27	mg/kg	SW846 6010A	02/13-02/16/98	CFA1E109
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Barium	3.8 B	5.5	mg/kg	SW846 6010A	02/13-02/16/98	CFA1E105
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Cadmium	ND	0.55	mg/kg	SW846 6010A	02/13-02/16/98	CFA1E106
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Lead	4.2	0.27	mg/kg	SW846 6010A	02/13-02/16/98	CFA1E10A
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Chromium	5.7	1.1	mg/kg	SW846 6010A	02/13-02/16/98	CFA1E107
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Selenium	0.29	0.27	mg/kg	SW846 6010A	02/13-02/16/98	CFA1E10C
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Silver	0.36 B	0.80	mg/kg	SW846 6010A	02/13-02/16/98	CFA1E108
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	

NOTE(S):

B Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PREBURN

General Chemistry

Lot-Sample #....: B8B110133-001
Date Sampled....: 02/10/98
% Moisture.....: 9.1

Work Order #....: CFA1E
Date Received...: 02/11/98

Matrix.....: SOLID

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Percent Solids	90.9	1.0	%	MCAWW 160.3 MOD	02/13/98	8044174
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Total Organic Halogens	ND	220	mg/kg	SW846 9020A	02/18/98	8049181
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

Quanterra Quality Control Program Summary (continued)

Surrogate Spike Recovery Evaluations

For GC and GC/MS analyses, known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added to sample fractions prior to sample extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is one indication of the overall method efficiency for the individual sample. The surrogate spike recovery data is displayed alongside acceptance limits at the bottom of each applicable analytical result report page. Where sufficient laboratory-generated data does not yet exist to determine appropriate control limits, advisory limits may be enacted until sufficient data is collected to allow implementation of control limits.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Evaluations

In conjunction with the analysis of a client-provided field sample, a known concentration of designated matrix spike compounds (target analytes) are added to two aliquots of the actual sample. Percent recovery determinations are calculated from both spiked aliquots, using target analyte concentrations already present in the actual sample as a baseline. The percent recovery determinations indicate the accuracy of the method specific to the target analytes (or other individual components represented by a subset of control analytes) in the individual sample matrix. Comparison of the percent recoveries in the two spiked aliquots yields a relative percent difference (RPD). Percent recovery and relative percent difference data is displayed alongside historical criteria, that may be used to judge individual sample matrix effects for specific analytes. MS/MSD data is evaluated by the laboratory with respect to the individual sample matrix. In cases where MS/MSD data indicate sample method performance outside of historical criteria, the laboratory control sample results are referenced to ensure acceptable method performance by the laboratory for the sample batch. For analyses which are inappropriately suited for matrix spikes (e.g. pH), non-spiked duplicate analyses are performed to generate precision data. Matrix spike duplicates are typically performed on at least one sample within each analytical batch. A minimum of 10% of all laboratory analyses are matrix spikes or duplicates.

Corrective Action Evaluations

The goal of the Quanterra Quality Control Program is to generate data that demonstrates process control, and allows for client usability of data. Where the analytical process is demonstrated to vary from established criteria, or client requirements have not been met, data evaluation resulting in corrective action may be required. Corrective action may include re-preparation and/or reanalysis of field samples and QC samples. Where appropriate or necessary to allow proper interpretation of results presented in the final report, details of corrective actions taken during the laboratory processing of samples are presented as a case narrative at the front of the report. Alternatively, routine corrective action, such as reanalysis, may be footnoted on individual sample result pages.

Analytical Result Qualifier Flags

Where applicable, data qualifiers may be appended to analytical results in order to allow for proper interpretation of the result presented. Typically, the presence of data qualifier flag on an analytical result page is accompanied by a footnote explaining the qualifier.

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: B8B110133
MB Lot-Sample #: B8B180000-197

Work Order #...: CFEPK101

Matrix.....: SOLID

Analysis Date...: 02/17/98
Dilution Factor: 1

Prep Date.....: 02/17/98

Prep Batch #...: 8049197

Final Wgt/Vol...: 5 mL

Initial Wgt/Vol: 100 uL

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Bromobenzene	ND	0.25	mg/kg	SW846 8010B
Bromodichloromethane	ND	0.25	mg/kg	SW846 8010B
Bromoform	ND	0.25	mg/kg	SW846 8010B
Bromomethane	ND	0.25	mg/kg	SW846 8010B
Carbon tetrachloride	ND	0.25	mg/kg	SW846 8010B
Chlorobenzene	ND	0.25	mg/kg	SW846 8010B
Dibromochloromethane	ND	0.25	mg/kg	SW846 8010B
Chloroethane	ND	0.25	mg/kg	SW846 8010B
2-Chloroethyl vinyl ether	ND	0.62	mg/kg	SW846 8010B
Chloroform	ND	0.25	mg/kg	SW846 8010B
Chloromethane	ND	0.25	mg/kg	SW846 8010B
Dibromomethane	ND	0.25	mg/kg	SW846 8010B
1,2-Dichlorobenzene	ND	0.25	mg/kg	SW846 8010B
1,3-Dichlorobenzene	ND	0.25	mg/kg	SW846 8010B
1,4-Dichlorobenzene	ND	0.25	mg/kg	SW846 8010B
Chlorodifluoromethane	ND	0.25	mg/kg	SW846 8010B
1,1-Dichloroethane	ND	0.25	mg/kg	SW846 8010B
1,2-Dichloroethane	ND	0.25	mg/kg	SW846 8010B
1,1-Dichloroethene	ND	0.25	mg/kg	SW846 8010B
trans-1,2-Dichloroethene	ND	0.25	mg/kg	SW846 8010B
1,2-Dichloropropane	ND	0.25	mg/kg	SW846 8010B
cis-1,3-Dichloropropene	ND	0.25	mg/kg	SW846 8010B
trans-1,3-Dichloropropene	ND	0.25	mg/kg	SW846 8010B
Trichlorofluoromethane	ND	0.25	mg/kg	SW846 8010B
1,1,1,2-Tetrachloroethane	ND	0.25	mg/kg	SW846 8010B
1,1,2,2-Tetrachloroethane	ND	0.25	mg/kg	SW846 8010B
Tetrachloroethene	ND	0.25	mg/kg	SW846 8010B
1,1,1-Trichloroethane	ND	0.25	mg/kg	SW846 8010B
1,1,2-Trichloroethane	ND	0.25	mg/kg	SW846 8010B
Trichloroethene	ND	0.25	mg/kg	SW846 8010B
1,2,3-Trichloropropane	ND	0.25	mg/kg	SW846 8010B
Vinyl chloride	ND	0.25	mg/kg	SW846 8010B
Methylene chloride	ND	0.62	mg/kg	SW846 8010B
cis-1,2-Dichloroethene	ND	0.25	mg/kg	SW846 8010B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
4-Bromofluorobenzene	102	(70 - 130)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.



Environmental
Services

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: B8B110133
MB Lot-Sample #: B8B180000-198

Work Order #...: CFEPL101

Matrix.....: SOLID

Analysis Date...: 02/17/98

Prep Date.....: 02/17/98

Final Wgt/Vol...: 5 mL

Dilution Factor: 1

Prep Batch #...: 8049198

Initial Wgt/Vol: 100 uL

PARAMETER	RESULT	REPORTING			METHOD
		LIMIT	UNITS		
Methyl tert-butyl ether	ND	0.25	mg/kg		SW846 8020A
Benzene	ND	0.25	mg/kg		SW846 8020A
Ethylbenzene	ND	0.25	mg/kg		SW846 8020A
Toluene	ND	0.25	mg/kg		SW846 8020A
Chlorobenzene	ND	0.25	mg/kg		SW846 8020A
1,2-Dichlorobenzene	ND	0.25	mg/kg		SW846 8020A
1,3-Dichlorobenzene	ND	0.25	mg/kg		SW846 8020A
1,4-Dichlorobenzene	ND	0.25	mg/kg		SW846 8020A
Xylenes (total)	ND	0.25	mg/kg		SW846 8020A

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
4-Bromofluorobenzene	100	(70 - 130)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC Semivolatiles

Client Lot #....: B8B110133
MB Lot-Sample #: B8B120000-180

Work Order #....: CFAND101

Matrix.....: SOLID

Analysis Date...: 02/13/98
Dilution Factor: 1

Prep Date.....: 02/12/98
Prep Batch #....: 8043180
Initial Wgt/Vol: 30 g

Final Wgt/Vol...: 2 mL

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	<u>UNITS</u>	<u>METHOD</u>
TPH (C8-C40)	ND	10	mg/kg	FL-DEP FL-PRO
<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>		
o-Terphenyl	<u>RECOVERY</u>	<u>LIMITS</u>		
Nonatriacontane	86	(22 - 166)		
	50	(10 - 192)		

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

HPLC

Client Lot #...: B8B110133
MB Lot-Sample #: B8B120000-179

Work Order #...: CFANC101

Matrix.....: SOLID

Analysis Date...: 02/17/98
Dilution Factor: 1

Prep Date.....: 02/12/98
Prep Batch #...: 8043179
Initial Wgt/Vol: 30 g

Final Wgt/Vol...: 1 mL

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	METHOD
Acenaphthene	ND	50	ug/kg	SW846 8310
Acenaphthylene	ND	50	ug/kg	SW846 8310
Anthracene	ND	50	ug/kg	SW846 8310
Benzo(a)anthracene	ND	5.0	ug/kg	SW846 8310
Benzo(a)pyrene	ND	5.0	ug/kg	SW846 8310
Benzo(b)fluoranthene	ND	5.0	ug/kg	SW846 8310
Benzo(ghi)perylene	ND	5.0	ug/kg	SW846 8310
Benzo(k)fluoranthene	ND	5.0	ug/kg	SW846 8310
Chrysene	ND	5.0	ug/kg	SW846 8310
Dibenz(a,h)anthracene	ND	5.0	ug/kg	SW846 8310
Fluoranthene	ND	5.0	ug/kg	SW846 8310
Fluorene	ND	50	ug/kg	SW846 8310
Indeno(1,2,3-cd)pyrene	ND	5.0	ug/kg	SW846 8310
1-Methylnaphthalene	ND	50	ug/kg	SW846 8310
2-Methylnaphthalene	ND	50	ug/kg	SW846 8310
Naphthalene	ND	50	ug/kg	SW846 8310
Phenanthrene	ND	50	ug/kg	SW846 8310
Pyrene	ND	5.0	ug/kg	SW846 8310

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Carbazole	88	(30 - 130)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

TOTAL Metals

Client Lot #....: B8B110133

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: B8B130000-177 Prep Batch #....: 8044177						
Mercury	ND	0.10	mg/kg	SW846 7471A	02/13/98	CFCNP101
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
MB Lot-Sample #: B8B130000-182 Prep Batch #....: 8044182						
Arsenic	ND	0.25	mg/kg	SW846 6010A	02/13-02/16/98	CFCQ6107
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Barium	ND	5.0	mg/kg	SW846 6010A	02/13-02/16/98	CFCQ6103
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Cadmium	ND	0.50	mg/kg	SW846 6010A	02/13-02/16/98	CFCQ6104
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Lead	ND	0.25	mg/kg	SW846 6010A	02/13-02/16/98	CFCQ6101
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Chromium	ND	1.0	mg/kg	SW846 6010A	02/13-02/16/98	CFCQ6105
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Selenium	ND	0.25	mg/kg	SW846 6010A	02/13-02/16/98	CFCQ6102
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	
Silver	ND	0.73	mg/kg	SW846 6010A	02/13-02/16/98	CFCQ6106
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #....: B8B110133

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Total Organic Halogens	ND	200	mg/kg	SW846 9020A	02/18/98	8049181
		Dilution Factor: 1		Initial Wgt/Vol:	Final Wgt/Vol...: 0	

Work Order #: CFEL6101 MB Lot-Sample #: A8B180000-181

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #....: B8B110133 Work Order #....: CFEPK102 Matrix.....: SOLID
 LCS Lot-Sample#: B8B180000-197
 Prep Date.....: 02/17/98 Analysis Date...: 02/17/98
 Prep Batch #....: 8049197
 Dilution Factor: 1 Final Wgt/Vol...: 5 mL
 Initial Wgt/Vol: 100 uL

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>
Chlorobenzene	98	(72 - 128)	SW846 8010B
Chloroform	84	(64 - 150)	SW846 8010B
1,3-Dichlorobenzene	96	(50 - 151)	SW846 8010B
1,1-Dichloroethene	88	(63 - 158)	SW846 8010B
Trichloroethene	68	(55 - 154)	SW846 8010B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
4-Bromofluorobenzene	106	(70 - 130)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.
 Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: B8B110133 Work Order #...: CFEPL102 Matrix.....: SOLID
LCS Lot-Sample#: B8B180000-198
Prep Date.....: 02/17/98 Analysis Date...: 02/17/98
Prep Batch #...: 8049198
Dilution Factor: 1 Final Wgt/Vol...: 5 mL
Initial Wgt/Vol: 100 uL

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>
Benzene	98	(61 - 141)	SW846 8020A
Chlorobenzene	96	(67 - 135)	SW846 8020A
Toluene	100	(61 - 136)	SW846 8020A

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
4-Bromofluorobenzene	102	(70 - 130)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.
Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Semivolatiles

Client Lot #....: B8B110133 Work Order #....: CFAND102 Matrix.....: SOLID
 LCS Lot-Sample#: B8B120000-180
 Prep Date.....: 02/12/98 Analysis Date...: 02/13/98
 Prep Batch #....: 8043180
 Dilution Factor: 1 Final Wgt/Vol...: 2 mL
 Initial Wgt/Vol: 30 g

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>
TPH (C8-C40)	68	(52 - 112)	FL-DEP FL-PRO
<u>SURROGATE</u>		<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
o-Terphenyl		88	(22 - 166)
Nonatriacontane		39	(10 - 192)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

HPLC

Client Lot #...: B8B110133 Work Order #...: CFANC102 Matrix.....: SOLID
LCS Lot-Sample#: B8B120000-179
Prep Date.....: 02/12/98 Analysis Date...: 02/17/98
Prep Batch #...: 8043179
Dilution Factor: 1 Final Wgt/Vol...: 1 mL
Initial Wgt/Vol: 30 g

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
Acenaphthene	71	(43 - 115)	SW846 8310
Chrysene	73	(48 - 115)	SW846 8310
Fluorene	75	(44 - 115)	SW846 8310
1-Methylnaphthalene	68	(43 - 115)	SW846 8310
Naphthalene	90	(36 - 115)	SW846 8310
Pyrene	73	(48 - 115)	SW846 8310

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Carbazole	88	(30 - 130)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: B8B110133

Matrix.....: SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: B8B130000-177 Prep Batch #...: 8044177					
Mercury	102	(90 - 110)	SW846 7471A	02/13/98	CFCNP102
		Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol...: 0
LCS Lot-Sample#: B8B130000-182 Prep Batch #...: 8044182					
Barium	101	(87 - 110)	SW846 6010A	02/13-02/16/98	CFCQ610A
		Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol...: 0
Cadmium	98	(87 - 110)	SW846 6010A	02/13-02/16/98	CFCQ610C
		Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol...: 0
Chromium	99	(87 - 111)	SW846 6010A	02/13-02/16/98	CFCQ610D
		Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol...: 0
Silver	89	(84 - 110)	SW846 6010A	02/13-02/16/98	CFCQ610E
		Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol...: 0
Arsenic	96	(84 - 110)	SW846 6010A	02/13-02/16/98	CFCQ610F
		Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol...: 0
Lead	97	(86 - 110)	SW846 6010A	02/13-02/16/98	CFCQ6108
		Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol...: 0
Selenium	93	(77 - 110)	SW846 6010A	02/13-02/16/98	CFCQ6109
		Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol...: 0

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: B8B110133

Matrix.....: SOLID

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Total Organic Halogens	82	(75 - 125)	SW846 9020A	02/18/98	8049181
		Dilution Factor: 1	Initial Wgt/Vol:	Final Wgt/Vol...	0

Work Order #: CFEL6102 LCS Lot-Sample#: A8B180000-181

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT
GC Volatiles

Client Lot #....: B8B110133 Work Order #....: CFA1E11E-MS Matrix.....: SOLID
 MS Lot-Sample #: B8B110133-001 CFA1E11F-MSD
 Date Sampled...: 02/10/98 Date Received...: 02/11/98
 Prep Date.....: 02/17/98 Analysis Date...: 02/18/98
 Prep Batch #....: 8049197
 Dilution Factor: 1 Initial Wgt/Vol: 100 uL Final Wgt/Vol...: 5 mL
 % Moisture.....: 9.1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Chlorobenzene	66	(38 - 150)			SW846 8010B
	77	(38 - 150)	15	(0-25)	SW846 8010B
Chloroform	63	(49 - 133)			SW846 8010B
	64	(49 - 133)	1.8	(0-25)	SW846 8010B
1,3-Dichlorobenzene	66	(7.0- 187)			SW846 8010B
	68	(7.0- 187)	3.7	(0-25)	SW846 8010B
1,1-Dichloroethene	62	(28 - 167)			SW846 8010B
	66	(28 - 167)	6.0	(0-25)	SW846 8010B
Trichloroethene	60	(35 - 146)			SW846 8010B
	56	(35 - 146)	7.4	(0-25)	SW846 8010B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	110	(70 - 130)
	103	(70 - 130)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and reporting limits have been adjusted for dry weight.

Elevated reporting limits due to matrix interference.

Elevated reporting limits due to matrix interference.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: B8B110133 Work Order #...: CFA1E11G-MS Matrix.....: SOLID
 MS Lot-Sample #: B8B110133-001 CFA1E11H-MSD
 Date Sampled...: 02/10/98 Date Received...: 02/11/98
 Prep Date.....: 02/17/98 Analysis Date...: 02/18/98
 Prep Batch #...: 8049198
 Dilution Factor: 1 Initial Wgt/Vol: 100 uL Final Wgt/Vol...: 5 mL
 % Moisture.....: 9.1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Benzene	120	(39 - 150)			SW846 8020A
	118	(39 - 150)	1.6	(0-25)	SW846 8020A
Toluene	125	(46 - 148)			SW846 8020A
	124	(46 - 148)	0.62	(0-25)	SW846 8020A
Chlorobenzene	71	(55 - 135)			SW846 8020A
	76	(55 - 135)	7.0	(0-25)	SW846 8020A
<hr/>					
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS			
4-Bromofluorobenzene	126	(70 - 130)			
	118	(70 - 130)			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and reporting limits have been adjusted for dry weight.

Elevated reporting limits due to matrix interference.

Elevated reporting limits due to matrix interference.

MATRIX SPIKE SAMPLE EVALUATION REPORT
GC Semivolatiles

Client Lot #....: B8B110133 Work Order #....: CFA1E10J-MS Matrix.....: SOLID
 MS Lot-Sample #: B8B110133-001 CFA1E10K-MSD
 Date Sampled....: 02/10/98 Date Received...: 02/11/98
 Prep Date.....: 02/12/98 Analysis Date...: 02/13/98
 Prep Batch #....: 8043180
 Dilution Factor: 1 Initial Wgt/Vol: 30 g Final Wgt/Vol...: 2 mL
 % Moisture.....: 9.1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
TPH (C8-C40)	NC,MSB	(41 - 224)			FL-DEP FL-PRO
	NC,MSB	(41 - 224)		(0-25)	FL-DEP FL-PRO
SURROGATE		PERCENT RECOVERY		RECOVERY LIMITS	
o-Terphenyl		91		(22 - 166)	
		94		(22 - 166)	
Nonatriacontane		84		(10 - 192)	
		75		(10 - 192)	

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

ld print denotes control parameters

∩ The recovery and RPD were not calculated.

MSB The recovery and RPD were not calculated because the sample amount was greater than four times the spike amount.

MATRIX SPIKE SAMPLE EVALUATION REPORT

HPLC

Client Lot #....: B8B110133	Work Order #....: CFA1E10G-MS	Matrix.....: SOLID
MS Lot-Sample #: B8B110133-001	CFA1E10H-MSD	
Date Sampled....: 02/10/98	Date Received...: 02/11/98	
Prep Date.....: 02/12/98	Analysis Date...: 02/18/98	
Prep Batch #....: 8043179		
Dilution Factor: 1	Initial Wgt/Vol: 30 g	Final Wgt/Vol...: 1 mL
% Moisture.....: 9.1		

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Acenaphthene	58	(10 - 124)			SW846 8310
	49	(10 - 124)	16	(0-30)	SW846 8310
Chrysene	75	(10 - 199)			SW846 8310
	68	(10 - 199)	9.4	(0-30)	SW846 8310
Fluorene	72	(10 - 142)			SW846 8310
	68	(10 - 142)	5.8	(0-30)	SW846 8310
1-Methylnaphthalene	74	(30 - 130)			SW846 8310
	58	(30 - 130)	14	(0-30)	SW846 8310
Naphthalene	82	(10 - 122)			SW846 8310
	59	(10 - 122)	26	(0-30)	SW846 8310
Pyrene	110	(10 - 140)			SW846 8310
	116	(10 - 140)	5.2	(0-30)	SW846 8310

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Carbazole	76	(30 - 130)
	69	(30 - 130)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and reporting limits have been adjusted for dry weight.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: B8B110133

Date Sampled...: 02/10/98

Date Received...: 02/11/98

Matrix.....: SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD LIMITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: B8B110133-001 Prep Batch #...: 8044177						
Mercury	127 N	(80 - 120)		SW846 7471A	02/13/98	CFA1E10M
	129 N	(80 - 120)	1.5 (0-20)	SW846 7471A	02/13/98	CFA1E10N
			Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol... 0
MS Lot-Sample #: B8B110133-001 Prep Batch #...: 8044182						
Arsenic	79 N	(80 - 120)		SW846 6010A	02/13-02/16/98	CFA1E114
	79 N	(80 - 120)	0.21 (0-20)	SW846 6010A	02/13-02/16/98	CFA1E115
			Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol... 0
Barium	99	(80 - 120)		SW846 6010A	02/13-02/16/98	CFA1E10U
	99	(80 - 120)	0.24 (0-20)	SW846 6010A	02/13-02/16/98	CFA1E10V
			Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol... 0
Cadmium	94	(80 - 120)		SW846 6010A	02/13-02/16/98	CFA1E10W
	96	(80 - 120)	1.6 (0-20)	SW846 6010A	02/13-02/16/98	CFA1E10X
			Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol... 0
Lead	93	(80 - 120)		SW846 6010A	02/13-02/16/98	CFA1E10P
	96	(80 - 120)	2.8 (0-20)	SW846 6010A	02/13-02/16/98	CFA1E10Q
			Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol... 0
Chromium	97	(80 - 120)		SW846 6010A	02/13-02/16/98	CFA1E110
	99	(80 - 120)	2.5 (0-20)	SW846 6010A	02/13-02/16/98	CFA1E111
			Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol... 0
Selenium	57 N	(80 - 120)		SW846 6010A	02/13-02/16/98	CFA1E10R
	58 N	(80 - 120)	1.2 (0-20)	SW846 6010A	02/13-02/16/98	CFA1E10T
			Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol... 0
Silver	88	(80 - 120)		SW846 6010A	02/13-02/16/98	CFA1E112
	89	(80 - 120)	1.7 (0-20)	SW846 6010A	02/13-02/16/98	CFA1E113
			Dilution Factor: 1	Initial Wgt/Vol:		Final Wgt/Vol... 0

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

N Spiked analyte recovery is outside stated control limits.

Client: Brown + East Project Name: NA S Whiting Field
Date Received: 2/11/98 Lot Number: _____
Received By: Carol McNulty CUR Completed By: Carol McNulty

Cooler/Shipping Information:

Type: Cooler ☒ Box _____ Other _____

Cooler ID/Track #					
Temp (Celsius)	2°	3°			
Cooler ID/Track #					
Temp (Celsius)	2°				

Any "NO" responses or discrepancies should be explained in the "Comments" section below.

CHECKLIST

	YES	NO	NA
1. Were custody seals on shipping container(s) intact? Check "NA" if hand delivered. If "Yes," check one: CUSTODY SEAL SAVED <input type="checkbox"/> UNABLE TO SAVE CUSTODY SEAL <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
2. Were custody papers properly included with samples?	<input checked="" type="checkbox"/>		
3. Were custody papers properly filled out (ink, signed, match labels)?	<input checked="" type="checkbox"/>		
4. Did all bottles arrive in good condition (unbroken)?	<input checked="" type="checkbox"/>		
5. Were all bottle labels complete (sample #, date, signed, analysis, preservatives)?	<input checked="" type="checkbox"/>		
6. Were correct bottles used for the tests indicated?	<input checked="" type="checkbox"/>		
7. Were proper sample preservation techniques indicated?	<input checked="" type="checkbox"/>		
8. Were samples received within holding times? If "No," NCM required.	<input checked="" type="checkbox"/>		
9. Were all VOA bottles checked for the presence of air bubbles? If air bubbles were found, indicate in comment section.	<input checked="" type="checkbox"/>		
10. Were samples in direct contact with wet ice? If "No," check one: NO ICE <input type="checkbox"/> BLUE ICE <input type="checkbox"/>	<input checked="" type="checkbox"/>		
11. Were the samples received with a temperature blank? RECORD TEMPERATURE ABOVE If "No," check one: UNABLE TO DETERMINE TEMP <input type="checkbox"/> TEMP TAKEN FROM ICE/WATER NEAR SAMPLES <input type="checkbox"/>	<input checked="" type="checkbox"/>		
12. Were sample pHs checked and recorded by S.R. (see back for Page 2 - Sample pH)? NOTE: TOC and VOA samples are checked by laboratory analysts. If response is "Not Inspected," then a pH check is not required/performed by Sample Receiving and Page 2 is not applicable.	<input checked="" type="checkbox"/>		Not inspected - Page 2 not completed <input type="checkbox"/>
13. Were samples accepted into the laboratory?	<input checked="" type="checkbox"/>		

Comments:

Per Client MS/MSD is for MWC2. (pH for metals = < 2 + Fe-Pb)
Temp blank rec'd not on COC

Complete if applicable: NCM#: _____ Check one: Notified PM by E-mail ☐ Hard Copy ☐

Project Manager initials/date reviewed: 2-12-98 LK

Corrective Action: _____

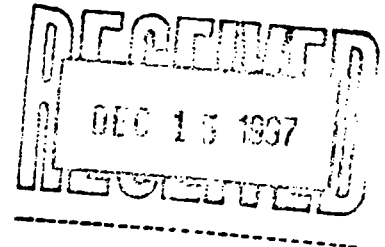
Corrective Action completed by/date: _____

APPENDIX H

SOIL LABORATORY DATA SHEETS

Quanterra Incorporated
5910 Breckenridge Parkway, Suite H
Tampa, Florida 33610

813 621-0784 Telephone
813 623-6021 Fax



ANALYTICAL REPORT

PROJECT NO. 7648

(NAS) Whiting Field

Lot #: B7K250141

Paul Calligan

Brown & Root Environmental

QUANTERRA INCORPORATED

Certification Numbers: E84059, HRS84297
FDEP CompQAP: 870270G

Nancy Robertson
Project Manager

December 10, 1997

		<u>MDL</u>	<u>Reporting Limit</u>
FL-DEP FL-PRO			
Total Petroleum Hydrocarbons	Q743	0.1 mg/L	0.5 mg/L
SW846 8020A			
Benzene	71-43-2	0.17 ug/L	1.0 ug/L
Chlorobenzene	108-90-7	0.21 ug/L	1.0 ug/L
1,2-Dichlorobenzene	95-50-1	0.16 ug/L	1.0 ug/L
1,3-Dichlorobenzene	541-73-1	0.16 ug/L	1.0 ug/L
1,4-Dichlorobenzene	106-46-7	0.18 ug/L	1.0 ug/L
Ethylbenzene	100-41-4	0.17 ug/L	1.0 ug/L
Methyl tert-butyl ether	1634-04-4	0.47 ug/L	1.0 ug/L
Naphthalene	91-20-3	0.94 ug/L	2.0 ug/L
Toluene	108-88-3	0.14 ug/L	1.0 ug/L
m-Xylene & p-Xylene	136777-61-2	0.29 ug/L	1.0 ug/L
o-Xylene	95-47-6	0.15 ug/L	1.0 ug/L
Xylenes, Total	1330-20-7	0.43 ug/L	1.0 ug/L
SW846 B310			
Acenaphthene	83-32-9	0.32 ug/L	1.0 ug/L
Acenaphthylene	208-96-8	0.38 ug/L	1.0 ug/L
Anthracene	120-12-7	0.21 ug/L	1.0 ug/L
Benzo[a]anthracene	56-55-3	0.035 ug/L	0.1 ug/L
Benzo[b]fluoranthene	205-99-2	0.079 ug/L	0.1 ug/L
Benzo[k]fluoranthene	207-08-9	0.043 ug/L	0.15 ug/L
Benzo[g,h,i]perylene	191-24-2	0.1 ug/L	0.2 ug/L
Benzo[a]pyrene	50-32-8	0.04 ug/L	0.1 ug/L
Chrysene	218-01-9	0.034 ug/L	0.1 ug/L
Dibenz(a,h)anthracene	53-70-3	0.11 ug/L	0.2 ug/L
Fluoranthene	206-44-0	0.053 ug/L	0.2 ug/L
Fluorene	86-73-7	0.82 ug/L	2.0 ug/L
Indeno[1,2,3-cd]pyrene	193-39-5	0.014 ug/L	0.1 ug/L
2-Methylnaphthalene	91-57-6	0.39 ug/L	1.0 ug/L
1-Methylnaphthalene	90-12-0	0.38 ug/L	1.0 ug/L
Naphthalene	91-20-3	0.41 ug/L	1.0 ug/L
Phenanthrene	85-01-8	0.27 ug/L	1.0 ug/L
Pyrene	129-00-0	0.068 ug/L	0.2 ug/L

		<u>MDL</u>	<u>Reporting Limit</u>
L-DEP FL-PRO			
Total Petroleum Hydrocarbons	Q743	3.5 mg/kg	10.0 mg/kg
SW846 8020A			
Benzene	71-43-2	0.58 ug/kg	2.0 ug/kg
Chlorobenzene	108-90-7	0.89 ug/kg	2.0 ug/kg
1,2-Dichlorobenzene	95-50-1	1.0 ug/kg	2.0 ug/kg
1,3-Dichlorobenzene	541-73-1	0.92 ug/kg	2.0 ug/kg
1,4-Dichlorobenzene	106-46-7	0.95 ug/kg	2.0 ug/kg
Ethylbenzene	100-41-4	0.45 ug/kg	2.0 ug/kg
Methyl tert-butyl ether	1634-04-4	1.1 ug/kg	2.0 ug/kg
Naphthalene	91-20-3	2.1 ug/kg	5.0 ug/kg
Toluene	108-88-3	0.43 ug/kg	2.0 ug/kg
m-Xylene & p-Xylene	136777-61-2	0.87 ug/kg	2.0 ug/kg
o-Xylene	95-47-6	0.47 ug/kg	2.0 ug/kg
Xylenes, Total	1330-20-7	0.47 ug/kg	2.0 ug/kg
SW846 8310			
Acenaphthene	83-32-9	13.0 ug/kg	50.0 ug/kg
Acenaphthylene	208-96-8	17.0 ug/kg	50.0 ug/kg
Anthracene	120-12-7	11.0 ug/kg	50.0 ug/kg
Benzo[a]anthracene	56-55-3	1.3 ug/kg	5.0 ug/kg
Benzo[b]fluoranthene	205-99-2	1.7 ug/kg	5.0 ug/kg
Benzo[k]fluoranthene	207-08-9	1.1 ug/kg	5.0 ug/kg
Benzo[g,h,i]perylene	191-24-2	1.9 ug/kg	5.0 ug/kg
Benzo[a]pyrene	50-32-8	1.3 ug/kg	5.0 ug/kg
Chrysene	218-01-9	1.0 ug/kg	5.0 ug/kg
Dibenz[a,h]anthracene	53-70-3	3.1 ug/kg	5.0 ug/kg
Fluoranthene	206-44-0	2.9 ug/kg	5.0 ug/kg
Fluorene	86-73-7	17.0 ug/kg	50.0 ug/kg
Indeno[1,2,3-cd]pyrene	193-39-5	1.0 ug/kg	5.0 ug/kg
2-Methylnaphthalene	91-57-6	1.2 ug/kg	50.0 ug/kg
1-Methylnaphthalene	90-12-0	14.0 ug/kg	50.0 ug/kg
Naphthalene	91-20-3	14.0 ug/kg	50.0 ug/kg
Phenanthrene	85-01-8	12.0 ug/kg	50.0 ug/kg
Pyrene	129-00-0	2.3 ug/kg	5.0 ug/kg

METHODS SUMMARY

B7K250141

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Aromatic Volatile Organics by GC	SW846 8020A	
Aromatic Volatile Organics by GC	SW846 8020A	SW846 5030
Petroleum Range Organics	FL-DEP FL-PRO	
Polynuclear Aromatic Hydrocarbons by HPLC	SW846 8310	SW846 3520
Polynuclear Aromatic Hydrocarbons by HPLC	SW846 8310	SW846 3540
Total Residue as Percent Solids	MCAWW 160.3 MOD	MCAWW 160.3 MOD

References:

- FL-DEP State of Florida Department of Environmental Protection,
 Florida Administrative Code.
- MCAWW "Methods for Chemical Analysis of Water and Wastes",
 EPA-600/4-79-020, March 1983 and subsequent revisions.
- SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical
 Methods", Third Edition, November 1986 and its updates.



Environmental
Services

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: OWS-SS-SB05-0506

GC Volatiles

Lot-Sample #...: B7K250141-001 Work Order #...: CE8FW101 Matrix.....: SOLID
Date Sampled...: 11/19/97 Date Received...: 11/25/97
Prep Date.....: 11/30/97 Analysis Date...: 12/01/97
Prep Batch #...: 7335125
Dilution Factor: 1 Initial Wgt/Vol: 100 uL Final Wgt/Vol...: 5 mL
% Moisture.....: 14

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Methyl tert-butyl ether	ND	0.29	mg/kg	SW846 8020A
Benzene	ND	0.29	mg/kg	SW846 8020A
Ethylbenzene	5.0	0.29	mg/kg	SW846 8020A
Toluene	0.30	0.29	mg/kg	SW846 8020A
Chlorobenzene	ND	0.29	mg/kg	SW846 8020A
1,2-Dichlorobenzene	ND	0.29	mg/kg	SW846 8020A
1,3-Dichlorobenzene	ND	0.29	mg/kg	SW846 8020A
1,4-Dichlorobenzene	ND	0.29	mg/kg	SW846 8020A
Xylenes (total)	2.9	0.29	mg/kg	SW846 8020A

	PERCENT RECOVERY	RECOVERY LIMITS
m-Bromofluorobenzene	97	(70 - 130)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: OWS-SS-SB05-0506

GC Semivolatiles

Lot-Sample #....: B7K250141-001	Work Order #....: CE8FW103	Matrix.....: SOLID
Date Sampled....: 11/19/97	Date Received...: 11/25/97	
Prep Date.....: 11/26/97	Analysis Date...: 12/01/97	
Prep Batch #....: 7330223		
Dilution Factor: 1	Initial Wgt/Vol: 30 g	Final Wgt/Vol...: 2 mL
% Moisture.....: 14		

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
TPH (C8-C40)	540	12	mg/kg	FL-DEP FL-PRO

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
o-Terphenyl	93	(22 - 166)
Nonatriacontane	48	(10 - 192)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.



Environmental
Services

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: OWS-SS-SB05-0506

HPLC

Lot-Sample #....: B7K250141-001 Work Order #....: CE8FW102 Matrix.....: SOLID
Date Sampled....: 11/19/97 Date Received...: 11/25/97
Prep Date.....: 12/02/97 Analysis Date...: 12/05/97
Prep Batch #....: 7336192
Dilution Factor: 1 Initial Wgt/Vol: 30 g Final Wgt/Vol...: 1 mL
% Moisture.....: 14

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Acenaphthene	ND	58	ug/kg	SW846 8310
Acenaphthylene	ND	58	ug/kg	SW846 8310
Anthracene	ND	58	ug/kg	SW846 8310
Benzo(a)anthracene	ND	5.8	ug/kg	SW846 8310
Benzo(a)pyrene	ND	5.8	ug/kg	SW846 8310
Benzo(b)fluoranthene	ND	5.8	ug/kg	SW846 8310
Benzo(ghi)perylene	ND	5.8	ug/kg	SW846 8310
Benzo(k)fluoranthene	ND	5.8	ug/kg	SW846 8310
Chrysene	ND	5.8	ug/kg	SW846 8310
Dibenz(a,h)anthracene	ND	5.8	ug/kg	SW846 8310
Fluoranthene	ND	5.8	ug/kg	SW846 8310
Fluorene	150	58	ug/kg	SW846 8310
Indeno(1,2,3-cd)pyrene	ND	5.8	ug/kg	SW846 8310
1-Methylnaphthalene	1800	58	ug/kg	SW846 8310
2-Methylnaphthalene	2000	58	ug/kg	SW846 8310
Naphthalene	490	58	ug/kg	SW846 8310
Phenanthrene	ND	58	ug/kg	SW846 8310
Pyrene	ND	5.8	ug/kg	SW846 8310
PERCENT		RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Carbazole	70	(30 - 130)		

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: OWS-SS-SB05-0506D

GC Volatiles

Lot-Sample #....: B7K250141-002	Work Order #....: CE8G5101	Matrix.....: SOLID
Date Sampled....: 11/19/97	Date Received...: 11/25/97	
Prep Date.....: 12/03/97	Analysis Date...: 12/03/97	
Prep Batch #....: 7336257		
Dilution Factor: 1	Initial Wgt/Vol: 1 g	Final Wgt/Vol...: 5 mL
% Moisture.....: 14		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Methyl tert-butyl ether	ND G	5.8	ug/kg	SW846 8020A
Benzene	ND G	5.8	ug/kg	SW846 8020A
Ethylbenzene	ND G	5.8	ug/kg	SW846 8020A
Toluene	7.1 G	5.8	ug/kg	SW846 8020A
Chlorobenzene	ND G	5.8	ug/kg	SW846 8020A
1,2-Dichlorobenzene	ND G	5.8	ug/kg	SW846 8020A
1,3-Dichlorobenzene	ND G	5.8	ug/kg	SW846 8020A
1,4-Dichlorobenzene	ND G	5.8	ug/kg	SW846 8020A
Xylenes (total)	ND G	5.8	ug/kg	SW846 8020A

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
4-Bromofluorobenzene	84	(70 - 130)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: OWS-SS-SB05-0506D

GC Semivolatiles

Lot-Sample #....: B7K250141-002 Work Order #....: CE8G5103 Matrix.....: SOLID
Date Sampled....: 11/19/97 Date Received...: 11/25/97
Prep Date.....: 11/26/97 Analysis Date...: 12/01/97
Prep Batch #....: 7330223
Dilution Factor: 1 Initial Wgt/Vol: 30 g Final Wgt/Vol...: 2 mL
% Moisture.....: 14

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
TPH (C8-C40)	130	12	mg/kg	FL-DEP FL-PRO
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS		
o-Terphenyl	94	(22 - 166)		
Nonatriacontane	65	(10 - 192)		

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: OWS-SS-SB05-0506D

HPLC

Lot-Sample #....: B7K250141-002	Work Order #....: CE8G5102	Matrix.....: SOLID
Date Sampled....: 11/19/97	Date Received...: 11/25/97	
Prep Date.....: 12/02/97	Analysis Date...: 12/05/97	
Prep Batch #....: 7336192		
Dilution Factor: 1	Initial Wgt/Vol: 30 g	Final Wgt/Vol...: 1 mL
% Moisture.....: 14		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Acenaphthene	ND	58	ug/kg	SW846 8310
Acenaphthylene	ND	58	ug/kg	SW846 8310
Anthracene	ND	58	ug/kg	SW846 8310
Benzo (a) anthracene	ND	5.8	ug/kg	SW846 8310
Benzo (a) pyrene	ND	5.8	ug/kg	SW846 8310
Benzo (b) fluoranthene	ND	5.8	ug/kg	SW846 8310
Benzo (ghi) perylene	ND	5.8	ug/kg	SW846 8310
Benzo (k) fluoranthene	ND	5.8	ug/kg	SW846 8310
Chrysene	ND	5.8	ug/kg	SW846 8310
Dibenz (a, h) anthracene	ND	5.8	ug/kg	SW846 8310
Fluoranthene	ND	5.8	ug/kg	SW846 8310
Fluorene	ND	58	ug/kg	SW846 8310
Indeno (1, 2, 3-cd) pyrene	ND	5.8	ug/kg	SW846 8310
1-Methylnaphthalene	93	58	ug/kg	SW846 8310
2-Methylnaphthalene	110	58	ug/kg	SW846 8310
Naphthalene	30 J	58	ug/kg	SW846 8310
Phenanthrene	ND	58	ug/kg	SW846 8310
Pyrene	ND	5.8	ug/kg	SW846 8310

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Carbazole	91	(30 - 130)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: OWS-SS-SB01-1112

GC Volatiles

Lot-Sample #....: B7K250141-003	Work Order #....: CE8G8101	Matrix.....: SOLID
Date Sampled....: 11/19/97	Date Received...: 11/25/97	
Prep Date.....: 11/30/97	Analysis Date...: 12/01/97	
Prep Batch #....: 7335125		
Dilution Factor: 1	Initial Wgt/Vol: 100 uL	Final Wgt/Vol...: 5 mL
% Moisture.....: 17		

		REPORTING		
PARAMETER	RESULT	LIMIT	UNITS	METHOD
Methyl tert-butyl ether	ND	0.30	mg/kg	SW846 8020A
Benzene	ND	0.30	mg/kg	SW846 8020A
Ethylbenzene	2.8	0.30	mg/kg	SW846 8020A
Toluene	0.053 J	0.30	mg/kg	SW846 8020A
Chlorobenzene	ND	0.30	mg/kg	SW846 8020A
1,2-Dichlorobenzene	ND	0.30	mg/kg	SW846 8020A
1,3-Dichlorobenzene	ND	0.30	mg/kg	SW846 8020A
1,4-Dichlorobenzene	ND	0.30	mg/kg	SW846 8020A
Xylenes (total)	4.6	0.30	mg/kg	SW846 8020A
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS		
-Bromofluorobenzene	96	(70 - 130)		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: OWS-SS-SB01-1112

: GC Semivolatiles

Lot-Sample #....: B7K250141-003	Work Order #....: CE8G8103	Matrix.....: SOLID
Date Sampled....: 11/19/97	Date Received...: 11/25/97	
Prep Date.....: 11/26/97	Analysis Date...: 12/02/97	
Prep Batch #....: 7330223		
Dilution Factor: 10	Initial Wgt/Vol: 30 g	Final Wgt/Vol...: 2 mL
% Moisture.....: 17		

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
TPH (C8-C40)	3800	120	mg/kg	FL-DEP FL-PRO

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
o-Terphenyl	NC, SRD	(22 - 166)
Nonatriacontane	NC, SRD	(10 - 192)

NOTE(S) :

NC The recovery and RPD were not calculated.

SRD The surrogate recovery was not calculated because the extract was diluted beyond the ability to quantitate a recovery.

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: OWS-SS-SB01-1112

HPLC

Lot-Sample #....: B7K250141-003	Work Order #....: CE8G8102	Matrix.....: SOLID
Date Sampled....: 11/19/97	Date Received...: 11/25/97	
Prep Date.....: 12/02/97	Analysis Date...: 12/08/97	
Prep Batch #....: 7336192		
Dilution Factor: 10	Initial Wgt/Vol: 30 g	Final Wgt/Vol...: 1 mL
% Moisture.....: 17		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Acenaphthene	ND	600	ug/kg	SW846 8310
Acenaphthylene	ND	600	ug/kg	SW846 8310
Anthracene	ND	600	ug/kg	SW846 8310
Benzo (a) anthracene	ND	60	ug/kg	SW846 8310
Benzo (a) pyrene	ND	60	ug/kg	SW846 8310
Benzo (b) fluoranthene	ND	60	ug/kg	SW846 8310
Benzo (ghi) perylene	ND	60	ug/kg	SW846 8310
Benzo (k) fluoranthene	ND	60	ug/kg	SW846 8310
Chrysene	ND	60	ug/kg	SW846 8310
Dibenz (a,h) anthracene	ND	60	ug/kg	SW846 8310
Fluoranthene	ND	60	ug/kg	SW846 8310
Fluorene	430 J	600	ug/kg	SW846 8310
Indeno (1,2,3-cd) pyrene	ND	60	ug/kg	SW846 8310
1-Methylnaphthalene	6800	600	ug/kg	SW846 8310
2-Methylnaphthalene	8900	600	ug/kg	SW846 8310
Naphthalene	3100	600	ug/kg	SW846 8310
Phenanthrene	ND	600	ug/kg	SW846 8310
Pyrene	ND	60	ug/kg	SW846 8310
PERCENT		RECOVERY		
SURROGATE	RECOVERY	LIMITS		
Carbazole	NC, SRD	(30 - 130)		

NOTE (S) :

NC The recovery and RPD were not calculated.

SRD The surrogate recovery was not calculated because the extract was diluted beyond the ability to quantitate a recovery.

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: OWS-SS-SB09-0506

GC Volatiles

Lot-Sample #....: B7K250141-004 Work Order #....: CE8GE101 Matrix.....: SOLID
 Date Sampled....: 11/19/97 Date Received...: 11/25/97
 Prep Date.....: 12/03/97 Analysis Date...: 12/03/97
 Prep Batch #....: 7336257
 Dilution Factor: 1 Initial Wgt/Vol: 2.5 g Final Wgt/Vol...: 5 mL
 % Moisture.....: 13

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Methyl tert-butyl ether	ND	2.3	ug/kg	SW846 8020A
Benzene	ND	2.3	ug/kg	SW846 8020A
Ethylbenzene	ND	2.3	ug/kg	SW846 8020A
Toluene	ND	2.3	ug/kg	SW846 8020A
Chlorobenzene	ND	2.3	ug/kg	SW846 8020A
1,2-Dichlorobenzene	ND	2.3	ug/kg	SW846 8020A
1,3-Dichlorobenzene	ND	2.3	ug/kg	SW846 8020A
1,4-Dichlorobenzene	ND	2.3	ug/kg	SW846 8020A
Xylenes (total)	ND	2.3	ug/kg	SW846 8020A

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
4-Bromofluorobenzene	83	(70 - 130)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: OWS-SS-SB09-0506

GC Semivolatiles

Lot-Sample #....: B7K250141-004 Work Order #....: CE8GE103 Matrix.....: SOLID
 Date Sampled....: 11/19/97 Date Received...: 11/25/97
 Prep Date.....: 11/26/97 Analysis Date...: 12/01/97
 Prep Batch #....: 7330223
 Dilution Factor: 1 Initial Wgt/Vol: 30 g Final Wgt/Vol...: 2 mL
 % Moisture.....: 13

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
TPH (C8-C40)	5.7 J	12	mg/kg	FL-DEP FL-PRO

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
o-Terphenyl	95	(22 - 166)
Nonatriacontane	72	(10 - 192)

NOTE(S):

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: OWS-SS-SB09-0506

HPLC

Lot-Sample #....: B7K250141-004	Work Order #....: CE8GE102	Matrix.....: SOLID
Date Sampled....: 11/19/97	Date Received...: 11/25/97	
Prep Date.....: 12/02/97	Analysis Date...: 12/05/97	
Prep Batch #....: 7336192		
Dilution Factor: 1	Initial Wgt/Vol: 30 g	Final Wgt/Vol...: 1 mL
% Moisture.....: 13		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Acenaphthene	ND	58	ug/kg	SW846 8310
Acenaphthylene	ND	58	ug/kg	SW846 8310
Anthracene	ND	58	ug/kg	SW846 8310
Benzo (a) anthracene	ND	5.8	ug/kg	SW846 8310
Benzo (a) pyrene	ND	5.8	ug/kg	SW846 8310
Benzo (b) fluoranthene	ND	5.8	ug/kg	SW846 8310
Benzo (ghi) perylene	ND	5.8	ug/kg	SW846 8310
Benzo (k) fluoranthene	ND	5.8	ug/kg	SW846 8310
Chrysene	ND	5.8	ug/kg	SW846 8310
Dibenz (a, h) anthracene	ND	5.8	ug/kg	SW846 8310
Fluoranthene	ND	5.8	ug/kg	SW846 8310
Fluorene	ND	58	ug/kg	SW846 8310
Indeno (1, 2, 3-cd) pyrene	ND	5.8	ug/kg	SW846 8310
1-Methylnaphthalene	ND	58	ug/kg	SW846 8310
2-Methylnaphthalene	ND	58	ug/kg	SW846 8310
Naphthalene	ND	58	ug/kg	SW846 8310
Phenanthrene	ND	58	ug/kg	SW846 8310
Pyrene	ND	5.8	ug/kg	SW846 8310
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS		
Carbazole	88	(30 - 130)		

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PDF-SS-SB01-0708

GC Volatiles

Lot-Sample #...: B7K250141-005 Work Order #...: CE8GJ101 Matrix.....: SOLID
Date Sampled...: 11/20/97 Date Received...: 11/25/97
Prep Date.....: 12/03/97 Analysis Date...: 12/03/97
Prep Batch #...: 7336257
Dilution Factor: 1 Initial Wgt/Vol: 2.5 g Final Wgt/Vol...: 5 mL
% Moisture.....: 13 Method.....: SW846 8020A

PARAMETER	RESULT	REPORTING	
		LIMIT	UNITS
Methyl tert-butyl ether	ND	2.3	ug/kg
Benzene	ND	2.3	ug/kg
Ethylbenzene	ND	2.3	ug/kg
Toluene	ND	2.3	ug/kg
Chlorobenzene	ND	2.3	ug/kg
1,2-Dichlorobenzene	ND	2.3	ug/kg
1,3-Dichlorobenzene	ND	2.3	ug/kg
1,4-Dichlorobenzene	ND	2.3	ug/kg
Xylenes (total)	ND	2.3	ug/kg

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Bromofluorobenzene	84	(70 - 130)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PDF-SS-SB01-0708

GC Semivolatiles

Lot-Sample #....: B7K250141-005	Work Order #....: CE8GJ103	Matrix.....: SOLID
Date Sampled....: 11/20/97	Date Received...: 11/25/97	
Prep Date.....: 11/26/97	Analysis Date...: 12/01/97	
Prep Batch #....: 7330223		
Dilution Factor: 1	Initial Wgt/Vol: 30 g	Final Wgt/Vol...: 2 mL
% Moisture.....: 13	Method.....: FL-DEP FL-PRO	

PARAMETER	RESULT	REPORTING	
		LIMIT	UNITS
TPH (C8-C40)	ND	12	mg/kg
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS	
o-Terphenyl	91	(22 - 166)	
Nonatriacontane	65	(10 - 192)	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PDF-SS-SB01-0708

HPLC

Lot-Sample #....: B7K250141-005	Work Order #....: CE8GJ102	Matrix.....: SOLID
Date Sampled....: 11/20/97	Date Received...: 11/25/97	
Prep Date.....: 12/02/97	Analysis Date...: 12/05/97	
Prep Batch #....: 7336192		
Dilution Factor: 1	Initial Wgt/Vol: 30 g	Final Wgt/Vol...: 1 mL
% Moisture.....: 13	Method.....: SW846 8310	

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	ND	58	ug/kg
Acenaphthylene	ND	58	ug/kg
Anthracene	ND	58	ug/kg
Benzo (a) anthracene	ND	5.8	ug/kg
Benzo (a) pyrene	ND	5.8	ug/kg
Benzo (b) fluoranthene	ND	5.8	ug/kg
Benzo (ghi) perylene	ND	5.8	ug/kg
Benzo (k) fluoranthene	ND	5.8	ug/kg
Chrysene	ND	5.8	ug/kg
Dibenz (a, h) anthracene	ND	5.8	ug/kg
Fluoranthene	ND	5.8	ug/kg
Fluorene	ND	58	ug/kg
Indeno (1, 2, 3-cd) pyrene	ND	5.8	ug/kg
Methylnaphthalene	ND	58	ug/kg
2-Methylnaphthalene	ND	58	ug/kg
Naphthalene	ND	58	ug/kg
Phenanthrene	ND	58	ug/kg
Pyrene	ND	5.8	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Carbazole	91	(30 - 130)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PDF-SS-SB06-1819

GC Volatiles

Lot-Sample #....: B7K250141-006 Work Order #....: CE8GK101 Matrix.....: SOLID
Date Sampled....: 11/20/97 Date Received...: 11/25/97
Prep Date.....: 12/03/97 Analysis Date...: 12/03/97
Prep Batch #....: 7336257
Dilution Factor: 1 Initial Wgt/Vol: 2.5 g Final Wgt/Vol...: 5 mL
% Moisture.....: 12 Method.....: SW846 8020A

PARAMETER	RESULT	REPORTING	
		LIMIT	UNITS
Methyl tert-butyl ether	ND	2.3	ug/kg
Benzene	ND	2.3	ug/kg
Ethylbenzene	ND	2.3	ug/kg
Toluene	ND	2.3	ug/kg
Chlorobenzene	ND	2.3	ug/kg
1,2-Dichlorobenzene	ND	2.3	ug/kg
1,3-Dichlorobenzene	ND	2.3	ug/kg
1,4-Dichlorobenzene	ND	2.3	ug/kg
Xylenes (total)	ND	2.3	ug/kg

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
4-Bromofluorobenzene	83	(70 - 130)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PDF-SS-SB06-1819

GC Semivolatiles

Lot-Sample #....: B7K250141-006 Work Order #....: CE8GK103 Matrix.....: SOLID
Date Sampled....: 11/20/97 Date Received...: 11/25/97
Prep Date.....: 11/26/97 Analysis Date...: 12/01/97
Prep Batch #....: 7330223
Dilution Factor: 1 Initial Wgt/Vol: 30 g Final Wgt/Vol...: 2 mL
% Moisture.....: 12 Method.....: FL-DEP FL-PRO

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>
TPH (C8-C40)	ND	11	mg/kg

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
o-Terphenyl	94	(22 - 166)
Nonatriacontane	62	(10 - 192)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PDF-SS-SB06-1819

HPLC

Lot-Sample #....: B7K250141-006	Work Order #....: CE8GK102	Matrix.....: SOLID
Date Sampled....: 11/20/97	Date Received...: 11/25/97	
Prep Date.....: 12/02/97	Analysis Date...: 12/06/97	
Prep Batch #....: 7336192		
Dilution Factor: 1	Initial Wgt/Vol: 30 g	Final Wgt/Vol...: 1 mL
% Moisture.....: 12	Method.....: SW846 8310	

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Acenaphthene	ND	57	ug/kg
Acenaphthylene	ND	57	ug/kg
Anthracene	ND	57	ug/kg
Benzo(a)anthracene	ND	5.7	ug/kg
Benzo(a)pyrene	ND	5.7	ug/kg
Benzo(b)fluoranthene	ND	5.7	ug/kg
Benzo(ghi)perylene	ND	5.7	ug/kg
Benzo(k)fluoranthene	ND	5.7	ug/kg
Chrysene	ND	5.7	ug/kg
Dibenz(a,h)anthracene	ND	5.7	ug/kg
Fluoranthene	ND	5.7	ug/kg
Fluorene	ND	57	ug/kg
Indeno(1,2,3-cd)pyrene	ND	5.7	ug/kg
1-Methylnaphthalene	ND	57	ug/kg
2-Methylnaphthalene	ND	57	ug/kg
Naphthalene	ND	57	ug/kg
Phenanthrene	ND	57	ug/kg
Pyrene	ND	5.7	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Carbazole	82	(30 - 130)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PDF-S8-SB06-1011

GC Volatiles

Lot-Sample #....: B7K250141-007 Work Order #....: CE8GL101 Matrix.....: SOLID
Date Sampled....: 11/20/97 Date Received...: 11/25/97
Prep Date.....: 12/03/97 Analysis Date...: 12/03/97
Prep Batch #....: 7336257
Dilution Factor: 1 Initial Wgt/Vol: 2.5 g Final Wgt/Vol...: 5 mL
% Moisture.....: 16 Method.....: SW846 8020A

PARAMETER	RESULT	REPORTING	
		LIMIT	UNITS
Methyl tert-butyl ether	ND	2.4	ug/kg
Benzene	ND	2.4	ug/kg
Ethylbenzene	0.60 J	2.4	ug/kg
Toluene	1.3 J	2.4	ug/kg
Chlorobenzene	ND	2.4	ug/kg
1,2-Dichlorobenzene	ND	2.4	ug/kg
1,3-Dichlorobenzene	ND	2.4	ug/kg
1,4-Dichlorobenzene	ND	2.4	ug/kg
Xylenes (total)	5.0	2.4	ug/kg

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
1-Bromofluorobenzene	85	(70 - 130)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.
J Estimated result. Result is less than RL.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PDF-SS-SB06-1011

GC Semivolatiles

Lot-Sample #....: B7K250141-007 Work Order #....: CE8GL103 Matrix.....: SOLID
Date Sampled....: 11/20/97 Date Received...: 11/25/97
Prep Date.....: 11/26/97 Analysis Date...: 12/01/97
Prep Batch #....: 7330223
Dilution Factor: 1 Initial Wgt/Vol: 30 g Final Wgt/Vol...: 2 mL
% Moisture.....: 16 Method.....: FL-DEP FL-PRO

PARAMETER	RESULT	REPORTING LIMIT	UNITS
TPH (C8-C40)	20	12	mg/kg
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS	
o-Terphenyl	88	(22 - 166)	
Nonatriacontane	65	(10 - 192)	

NOTE (S):

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PDF-SS-SB06-1011

HPLC

Lot-Sample #....: B7K250141-007	Work Order #....: CESGL102	Matrix.....: SOLID
Date Sampled....: 11/20/97	Date Received...: 11/25/97	
Prep Date.....: 12/02/97	Analysis Date...: 12/06/97	
Prep Batch #....: 7336192		
Dilution Factor: 1	Initial Wgt/Vol: 30 g	Final Wgt/Vol...: 1 mL
% Moisture.....: 16	Method.....: SW846 8310	

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	ND	59	ug/kg
Acenaphthylene	ND	59	ug/kg
Anthracene	ND	59	ug/kg
Benzo (a) anthracene	ND	5.9	ug/kg
Benzo (a) pyrene	ND	5.9	ug/kg
Benzo (b) fluoranthene	ND	5.9	ug/kg
Benzo (ghi) perylene	ND	5.9	ug/kg
Benzo (k) fluoranthene	ND	5.9	ug/kg
Chrysene	ND	5.9	ug/kg
Dibenz (a, h) anthracene	ND	5.9	ug/kg
Fluoranthene	ND	5.9	ug/kg
Fluorene	ND	59	ug/kg
Benzo (1, 2, 3-cd) pyrene	ND	5.9	ug/kg
1-methylnaphthalene	ND	59	ug/kg
2-Methylnaphthalene	ND	59	ug/kg
Naphthalene	ND	59	ug/kg
Phenanthrene	ND	59	ug/kg
Pyrene	ND	5.9	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Carbazole	90	(30 - 130)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PPS-SS-SB01-0405B

GC Volatiles

Lot-Sample #....: B7K250141-011 Work Order #....: CE8GT101 Matrix.....: WATER
Date Sampled....: 11/23/97 Date Received...: 11/25/97
Prep Date.....: 12/01/97 Analysis Date...: 12/01/97
Prep Batch #....: 7337270
Dilution Factor: 1 Initial Wgt/Vol: 5 mL Final Wgt/Vol...: 5 mL
Method.....: SW846 8020A

PARAMETER	RESULT	REPORTING	
		LIMIT	UNITS
Methyl tert-butyl ether	ND	1.0	ug/L
Benzene	ND	1.0	ug/L
Ethylbenzene	ND	1.0	ug/L
Toluene	0.19 J	1.0	ug/L
Chlorobenzene	ND	1.0	ug/L
1,2-Dichlorobenzene	ND	1.0	ug/L
1,3-Dichlorobenzene	0.24 J	1.0	ug/L
1,4-Dichlorobenzene	ND	1.0	ug/L
Xylenes (total)	ND	1.0	ug/L
		PERCENT	RECOVERY
		RECOVERY	LIMITS
SURROGATE			
4-Bromofluorobenzene	97	(70 - 130)	

NOTE(S):

J Estimated result. Result is less than RL.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PPS-SS-SB01-0405B

GC Semivolatiles

Lot-Sample #....: B7K250141-011 Work Order #....: CE8GT103 Matrix.....: WATER
Date Sampled....: 11/23/97 Date Received...: 11/25/97
Prep Date.....: 11/26/97 Analysis Date...: 12/01/97
Prep Batch #....: 7330178
Dilution Factor: 1 Initial Wgt/Vol: 974 mL Final Wgt/Vol...: 2 mL
Method.....: FL-DEP FL-PRO

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>
TPH (C8-C40)	ND	0.50	mg/L
<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>	
o-Terphenyl	90	(33 - 162)	
Nonatriacontane	38	(10 - 109)	

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PPS-SS-SB01-0405B

HPLC

Lot-Sample #....: B7K250141-011	Work Order #....: CERG102	Matrix.....: WATER
Date Sampled....: 11/23/97	Date Received...: 11/25/97	
Prep Date.....: 11/26/97	Analysis Date...: 12/02/97	
Prep Batch #....: 7330158		
Dilution Factor: 1	Initial Wgt/Vol: 981 mL	Final Wgt/Vol...: 1 mL
	Method.....: SW846 8310	

PARAMETER	RESULT	REPORTING	
		LIMIT	UNITS
Acenaphthene	ND	1.0	ug/L
Acenaphthylene	ND	1.0	ug/L
Anthracene	ND	1.0	ug/L
Benzo (a) anthracene	ND	0.092	ug/L
Benzo (a) pyrene	ND	0.10	ug/L
Benzo (b) fluoranthene	ND	0.092	ug/L
Benzo (ghi) perylene	ND	0.20	ug/L
Benzo (k) fluoranthene	ND	0.15	ug/L
Chrysene	ND	0.10	ug/L
Dibenz (a, h) anthracene	ND	0.20	ug/L
Fluoranthene	ND	0.20	ug/L
Fluorene	ND	2.0	ug/L
Indeno (1, 2, 3-cd) pyrene	ND	0.092	ug/L
1-Methylnaphthalene	ND	1.0	ug/L
2-Methylnaphthalene	ND	1.0	ug/L
Naphthalene	ND	1.0	ug/L
Phenanthrene	ND	1.0	ug/L
Pyrene	ND	0.20	ug/L

	PERCENT	RECOVERY
SURROGATE	RECOVERY	LIMITS
Carbazole	79	(30 - 130)



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BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PPS-SS-SB01-0405

GC Volatiles

Lot-Sample #....: B7K250141-012 Work Order #....: CE8GW101 Matrix.....: SOLID
Date Sampled....: 11/23/97 Date Received...: 11/25/97
Prep Date.....: 12/03/97 Analysis Date...: 12/03/97
Prep Batch #....: 7336257
Dilution Factor: 1 Initial Wgt/Vol: 1 g Final Wgt/Vol...: 5 mL
% Moisture.....: 14 Method.....: SW846 8020A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methyl tert-butyl ether	ND G	5.8	ug/kg
Benzene	10 G	5.8	ug/kg
Ethylbenzene	6.6 G	5.8	ug/kg
Toluene	69 G	5.8	ug/kg
Chlorobenzene	ND G	5.8	ug/kg
1,2-Dichlorobenzene	ND G	5.8	ug/kg
1,3-Dichlorobenzene	ND G	5.8	ug/kg
1,4-Dichlorobenzene	ND G	5.8	ug/kg
Xylenes (total)	110 G	5.8	ug/kg
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS	
Bromofluorobenzene	84	(70 - 130)	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.



Environmental
Services

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PPS-SS-SB01-0405

GC Semivolatiles

Lot-Sample #....: B7K250141-012 Work Order #....: CB8GW103 Matrix.....: SOLID
Date Sampled....: 11/23/97 Date Received...: 11/25/97
Prep Date.....: 11/26/97 Analysis Date...: 12/01/97
Prep Batch #....: 7330223
Dilution Factor: 1 Initial Wgt/Vol: 30 g Final Wgt/Vol...: 2 mL
% Moisture.....: 14 Method.....: FL-DEP FL-PRO

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>
TPH (C8-C40)	14	12	mg/kg

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
o-Terphenyl	91	(22 - 166)
Nonatriacontane	59	(10 - 192)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PPS-SS-SB01-0405

HPLC

Lot-Sample #....: 87K250141-012	Work Order #....: CE8GW102	Matrix.....: SOLID
Date Sampled....: 11/23/97	Date Received...: 11/25/97	
Prep Date.....: 12/02/97	Analysis Date...: 12/06/97	
Prep Batch #....: 7336192		
Dilution Factor: 1	Initial Wgt/Vol: 30 g	Final Wgt/Vol...: 1 mL
% Moisture.....: 14	Method.....: SW846 8310	

PARAMETER	RESULT	REPORTING	
		LIMIT	UNITS
Acenaphthene	ND	58	ug/kg
Acenaphthylene	ND	58	ug/kg
Anthracene	ND	58	ug/kg
Benzo (a) anthracene	ND	5.8	ug/kg
Benzo (a) pyrene	ND	5.8	ug/kg
Benzo (b) fluoranthene	ND	5.8	ug/kg
Benzo (ghi) perylene	ND	5.8	ug/kg
Benzo (k) fluoranthene	ND	5.8	ug/kg
Chrysene	ND	5.8	ug/kg
Dibenz (a,h) anthracene	ND	5.8	ug/kg
Fluoranthene	ND	5.8	ug/kg
Fluorene	ND	58	ug/kg
Indeno (1,2,3-cd) pyrene	ND	5.8	ug/kg
1-Methylnaphthalene	ND	58	ug/kg
2-Methylnaphthalene	ND	58	ug/kg
Naphthalene	ND	58	ug/kg
Phenanthrene	ND	58	ug/kg
Pyrene	ND	5.8	ug/kg

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Carbazole	97	(30 - 130)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PPS-SS-SB01-1011

GC Volatiles

Lot-Sample #....: B7K250141-013	Work Order #....: CE8GX101	Matrix.....: SOLID
Date Sampled....: 11/23/97	Date Received...: 11/25/97	
Prep Date.....: 12/03/97	Analysis Date...: 12/03/97	
Prep Batch #....: 7336257		
Dilution Factor: 1	Initial Wgt/Vol: 2.5 g	Final Wgt/Vol...: 5 mL
% Moisture.....: 12	Method.....: SW846 8020A	

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methyl tert-butyl ether	ND	2.3	ug/kg
Benzene	ND	2.3	ug/kg
Ethylbenzene	ND	2.3	ug/kg
Toluene	ND	2.3	ug/kg
Chlorobenzene	ND	2.3	ug/kg
1,2-Dichlorobenzene	ND	2.3	ug/kg
1,3-Dichlorobenzene	ND	2.3	ug/kg
1,4-Dichlorobenzene	ND	2.3	ug/kg
Xylenes (total)	0.76 J	2.3	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
4-Bromofluorobenzene	83	(70 - 130)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PPS-SS-SB01-1011

GC Semivolatiles

Lot-Sample #....: B7K250141-013 Work Order #....: CE8GX103 Matrix.....: SOLID
Date Sampled....: 11/23/97 Date Received...: 11/25/97
Prep Date.....: 11/26/97 Analysis Date...: 12/02/97
Prep Batch #....: 7330223
Dilution Factor: 5 Initial Wgt/Vol: 30 g Final Wgt/Vol...: 2 mL
% Moisture.....: 12 Method.....: FL-DEP FL-PRO

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
TPH (C8-C40)	2300	57	mg/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
o-Terphenyl	NC, SRD	(22 - 166)
Nonatriacontane	NC, SRD	(10 - 192)

NOTE(S) :

NC The recovery and RPD were not calculated.

SRD The surrogate recovery was not calculated because the extract was diluted beyond the ability to quantitate a recovery.

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PPS-88-SB01-1011

HPLC

Lot-Sample #....: B7K250141-013	Work Order #....: CE8GX102	Matrix.....: SOLID
Date Sampled....: 11/23/97	Date Received...: 11/25/97	
Prep Date.....: 12/02/97	Analysis Date...: 12/08/97	
Prep Batch #....: 7336192		
Dilution Factor: 20	Initial Wgt/Vol: 30 g	Final Wgt/Vol...: 1 mL
* Moisture.....: 12	Method.....: SW846 8310	

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	ND	1100	ug/kg
Acenaphthylene	ND	1100	ug/kg
Anthracene	690 J	1100	ug/kg
Benzo (a) anthracene	390	110	ug/kg
Benzo (a) pyrene	360	110	ug/kg
Benzo (b) fluoranthene	230	110	ug/kg
Benzo (ghi) perylene	120	110	ug/kg
Benzo (k) fluoranthene	220	110	ug/kg
Chrysene	370	110	ug/kg
Dibenz (a, h) anthracene	ND	110	ug/kg
Fluoranthene	3800	110	ug/kg
Fluorene	1100	1100	ug/kg
Indeno (1,2,3-cd) pyrene	110	110	ug/kg
1-Methylnaphthalene	3900	1100	ug/kg
2-Methylnaphthalene	6000	1100	ug/kg
Naphthalene	2100	1100	ug/kg
Phenanthrene	4000	1100	ug/kg
Pyrene	1700	110	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Carbazole	NC, SRD	(30 - 130)

NOTE(S) :

NC The recovery and RPD were not calculated.

SRD The surrogate recovery was not calculated because the extract was diluted beyond the ability to quantitate a recovery.

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PPS-SS-SB02-1011

GC Volatiles

Lot-Sample #....: B7K250141-014 Work Order #....: CE8H8101 Matrix.....: SOLID
 Date Sampled....: 11/23/97 Date Received...: 11/25/97
 Prep Date.....: 12/03/97 Analysis Date...: 12/03/97
 Prep Batch #....: 7336257
 Dilution Factor: 1 Initial Wgt/Vol: 2.5 g Final Wgt/Vol...: 5 mL
 % Moisture.....: 14 Method.....: SW846 8020A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methyl tert-butyl ether	ND	2.3	ug/kg
Benzene	ND	2.3	ug/kg
Ethylbenzene	ND	2.3	ug/kg
Toluene	ND	2.3	ug/kg
Chlorobenzene	ND	2.3	ug/kg
1,2-Dichlorobenzene	ND	2.3	ug/kg
1,3-Dichlorobenzene	ND	2.3	ug/kg
1,4-Dichlorobenzene	ND	2.3	ug/kg
Xylenes (total)	1.3 J	2.3	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
4-Bromofluorobenzene	83	(70 - 130)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PPS-SS-SB02-1011

GC Semivolatiles

Lot-Sample #....: B7K250141-014 Work Order #....: CE8H8103 Matrix.....: SOLID
Date Sampled....: 11/23/97 Date Received...: 11/25/97
Prep Date.....: 11/26/97 Analysis Date...: 12/02/97
Prep Batch #....: 7330223
Dilution Factor: 1 Initial Wgt/Vol: 30 g Final Wgt/Vol...: 2 mL
% Moisture.....: 14 Method.....: FL-DEP FL-PRO

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
TPH (C8-C40)	6.5 J	12	mg/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
o-Terphenyl	89	(22 - 166)
Nonatriacontane	70	(10 - 192)

NOTE (S) :

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: PPS-SS-SB02-1011

HPLC

Lot-Sample #...: B7K250141-014 **Work Order #...**: CE8H8102 **Matrix.....**: SOLID
Date Sampled...: 11/23/97 **Date Received...**: 11/25/97
Prep Date.....: 12/02/97 **Analysis Date...**: 12/06/97
Prep Batch #...: 7336192
Dilution Factor: 1 **Initial Wgt/Vol:** 30 g **Final Wgt/Vol...**: 1 mL
% Moisture.....: 14 **Method.....**: SW846 8310

PARAMETER	RESULT	REPORTING	
		LIMIT	UNITS
Acenaphthene	ND	58	ug/kg
Acenaphthylene	ND	58	ug/kg
Anthracene	ND	58	ug/kg
Benzo(a)anthracene	ND	5.8	ug/kg
Benzo(a)pyrene	ND	5.8	ug/kg
Benzo(b)fluoranthene	ND	5.8	ug/kg
Benzo(ghi)perylene	ND	5.8	ug/kg
Benzo(k)fluoranthene	ND	5.8	ug/kg
Chrysene	ND	5.8	ug/kg
Dibenz(a,h)anthracene	ND	5.8	ug/kg
Fluoranthene	ND	5.8	ug/kg
Fluorene	ND	58	ug/kg
Indeno(1,2,3-cd)pyrene	ND	5.8	ug/kg
1-Methylnaphthalene	ND	58	ug/kg
2-Methylnaphthalene	ND	58	ug/kg
Naphthalene	ND	58	ug/kg
Phenanthrene	ND	58	ug/kg
Pyrene	ND	5.8	ug/kg

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Carbazole	102	(30 - 130)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

BROWN & ROOT ENVIRONMENTAL

Client Sample ID: TRIP BLANK

GC Volatiles

Lot-Sample #...: B7K250141-015
Date Sampled...: 11/23/97
Prep Date...: 12/01/97
Prep Batch #...: 7337270
Dilution Factor: 1

Work Order #...: CE8HC101
Date Received...: 11/25/97
Analysis Date...: 12/01/97

Matrix.....: WATER

Initial Wgt/Vol: 5 mL

Final Wgt/Vol...: 5 mL

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Methyl tert-butyl ether	ND	1.0	ug/L	SW846 8020A
Benzene	ND	1.0	ug/L	SW846 8020A
Ethylbenzene	ND	1.0	ug/L	SW846 8020A
Toluene	ND	1.0	ug/L	SW846 8020A
Chlorobenzene	ND	1.0	ug/L	SW846 8020A
1,2-Dichlorobenzene	ND	1.0	ug/L	SW846 8020A
1,3-Dichlorobenzene	0.23 J	1.0	ug/L	SW846 8020A
1,4-Dichlorobenzene	ND	1.0	ug/L	SW846 8020A
Xylenes (total)	ND	1.0	ug/L	SW846 8020A
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS		
4-Bromofluorobenzene	103	(70 - 130)		

NOTE (S) :

J Estimated result. Result is less than RL.

Quality Control Summary

Quanterra QC Program Summary

Method Blanks

Laboratory Control Samples

Matrix Spike/Matrix Spike Duplicates

Chain-of-Custody

Quanterra Quality Control Program Summary

Quanterra Environmental Services considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with analytical results. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow. Further documentation of specific policies and procedures in use are available, upon request, from the Quanterra Quality Control Department.

The program described below provides Quanterra's interpretation of QC requirements described in SW-846, 3rd edition -Final Update II. Additional interpretations specific to other aspects of methods performed, such as instrument calibration and bench procedures, are described in program-specific documents (e.g. US Corps of Engineers, AFCEE, etc.) and associated method standard operating procedures. Where explicit program requirements or project requirements exist, certain elements of the Quanterra QC Program may be superseded by these requirements.

Elements of the Quanterra QC Program

Where other clear regulatory guidance, contract specifications, or client requirements are not available, the Quanterra QC Program provides guidance for Batch QC requirements. The Quality Control Batch is a set of up to 20 field samples of similar matrix, which are processed together under the same conditions, within the same time frame. Included in each Quality Control Batch is a Method Blank, Laboratory Control Sample, and Matrix Spike Duplicate. For methods that require independent sample preparation prior to analysis, the QC Batch is defined at the preparation stage. For methods that do not require independent sample preparation, the QC Batch is defined at the instrument. The QC Batch Number is provided on each result page in association with the parameter(s) presented, and may be used to cross-reference sample results with the associated QC data.

Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interference and background contamination levels associated with each applicable analytical method. Method blanks include all aspects of actual laboratory procedures involving sample preparation and analysis, substituting analyte-free water or solid for the actual sample. Under normal circumstances, the Method Blank should not exhibit analytes of interest above the reported detection limit. Due to the presence of some analytes in a typical laboratory setting, the following common laboratory contaminants are exceptions to this rule, provided they are not present in the method blank at greater than five times the reporting limit.

<u>Volatiles</u>	<u>Semi-Volatiles</u>	<u>Metals</u>
Methylene chloride	Dimethyl phthalate	Calcium
Toluene	Diethyl phthalate	Magnesium
2-Butanone	Di-n-butyl-phthalate	Sodium
Acetone	Butyl benzyl phthalate	
	Bis (2-ethylhexyl) phthalate	

A method blank is performed with each analytical batch. A minimum of 5% of all laboratory analyses are method blanks.

Laboratory Control Sample (LCS) Evaluations

Known concentrations of designated matrix spike (target analyte) compounds are added to a method blank prior to extraction and analysis. Percent recovery determinations of individual target analytes in the LCS demonstrate the laboratory's method performance for the QC Batch relative to these target analytes (or other individual components represented by a subset of control analytes). Percent recovery data is displayed alongside acceptance criteria, that is typically derived from laboratory historical data. Failure of a Laboratory Control Sample to meet established recovery criteria for control analytes is cause for corrective actions to occur, which typically includes re-extraction and re-analysis of all samples associated with the QC Batch. An LCS is performed with each analytical batch. A minimum of 5% of all laboratory analyses are laboratory control samples.

Quanterra Quality Control Program Summary (continued)

Surrogate Spike Recovery Evaluations

For GC and GC/MS analyses, known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added to sample fractions prior to sample extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is one indication of the overall method efficiency for the individual sample. The surrogate spike recovery data is displayed alongside acceptance limits at the bottom of each applicable analytical result report page. Where sufficient laboratory-generated data does not yet exist to determine appropriate control limits, advisory limits may be enacted until sufficient data is collected to allow implementation of control limits.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Evaluations

In conjunction with the analysis of a client-provided field sample, a known concentration of designated matrix spike compounds (target analytes) are added to two aliquots of the actual sample. Percent recovery determinations are calculated from both spiked aliquots, using target analyte concentrations already present in the actual sample as a baseline. The percent recovery determinations indicate the accuracy of the method specific to the target analytes (or other individual components represented by a subset of control analytes) in the individual sample matrix. Comparison of the percent recoveries in the two spiked aliquots yields a relative percent difference (RPD). Percent recovery and relative percent difference data is displayed alongside historical criteria, that may be used to judge individual sample matrix effects for specific analytes. MS/MSD data is evaluated by the laboratory with respect to the individual sample matrix. In cases where MS/MSD data indicate sample method performance outside of historical criteria, the laboratory control sample results are referenced to ensure acceptable method performance by the laboratory for the sample batch. For analyses which are inappropriately suited for matrix spikes (e.g. pH), non-spiked duplicate analyses are performed to generate precision data. Matrix spike duplicates are typically performed on at least one sample within each analytical batch. A minimum of 10% of all laboratory analyses are matrix spikes or duplicates.

Corrective Action Evaluations

The goal of the Quanterra Quality Control Program is to generate data that demonstrates process control, and allows for client usability of data. Where the analytical process is demonstrated to vary from established criteria, or client requirements have not been met, data evaluation resulting in corrective action may be required. Corrective action may include re-preparation and/or reanalysis of field samples and QC samples. Where appropriate or necessary to allow proper interpretation of results presented in the final report, details of corrective actions taken during the laboratory processing of samples are presented as a case narrative at the front of the report. Alternatively, routine corrective action, such as reanalysis, may be footnoted on individual sample result pages.

Analytical Result Qualifier Flags

Where applicable, data qualifiers may be appended to analytical results in order to allow for proper interpretation of the result presented. Typically, the presence of data qualifier flag on an analytical result page is accompanied by a footnote explaining the qualifier.



Environmental
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METHOD BLANK REPORT

GC Volatiles

Client Lot #...: B7K250141
MB Lot-Sample #: B7L010000-125

Work Order #...: CEA4R101

Matrix.....: SOLID

Analysis Date...: 12/01/97

Prep Date.....: 11/30/97

Final Wgt/Vol...: 5 mL

Dilution Factor: 1

Prep Batch #...: 7335125

Initial Wgt/Vol: 100 uL

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	METHOD
Methyl tert-butyl ether	ND	0.25	mg/kg	SW846 8020A
Benzene	ND	0.25	mg/kg	SW846 8020A
Ethylbenzene	ND	0.25	mg/kg	SW846 8020A
Toluene	ND	0.25	mg/kg	SW846 8020A
Chlorobenzene	ND	0.25	mg/kg	SW846 8020A
1,2-Dichlorobenzene	ND	0.25	mg/kg	SW846 8020A
1,3-Dichlorobenzene	ND	0.25	mg/kg	SW846 8020A
1,4-Dichlorobenzene	ND	0.25	mg/kg	SW846 8020A
Xylenes (total)	ND	0.25	mg/kg	SW846 8020A

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
4-Bromofluorobenzene	106	(70 - 130)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: B7K250141
MB Lot-Sample #: B7L020000-257

Work Order #...: CEC1L101

Matrix.....: SOLID

Analysis Date...: 12/02/97

Prep Date.....: 12/02/97

Final Wgt/Vol...: 5 mL

Dilution Factor: 1

Prep Batch #...: 7336257

Initial Wgt/Vol: 2.5 g

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	METHOD
Methyl tert-butyl ether	ND	2.0	ug/kg	SW846 8020A
Benzene	ND	2.0	ug/kg	SW846 8020A
Ethylbenzene	ND	2.0	ug/kg	SW846 8020A
Toluene	ND	2.0	ug/kg	SW846 8020A
Chlorobenzene	ND	2.0	ug/kg	SW846 8020A
1,2-Dichlorobenzene	ND	2.0	ug/kg	SW846 8020A
1,3-Dichlorobenzene	ND	2.0	ug/kg	SW846 8020A
1,4-Dichlorobenzene	ND	2.0	ug/kg	SW846 8020A
Xylenes (total)	ND	2.0	ug/kg	SW846 8020A

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
4-Bromofluorobenzene	81	(70 - 130)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC Volatiles

Client Lot #....: B7K250141
MB Lot-Sample #: B7L030000-270

Work Order #....: CECNN101

Matrix.....: WATER

Analysis Date...: 12/01/97
Dilution Factor: 1

Prep Date.....: 12/01/97

Prep Batch #....: 7337270

Final Wgt/Vol...: 5 mL

Initial Wgt/Vol: 5 mL

PARAMETER	RESULT	REPORTING			METHOD
		LIMIT	UNITS		
Methyl tert-butyl ether	ND	1.0	ug/L		SW846 8020A
Benzene	ND	1.0	ug/L		SW846 8020A
Ethylbenzene	ND	1.0	ug/L		SW846 8020A
Toluene	ND	1.0	ug/L		SW846 8020A
Chlorobenzene	ND	1.0	ug/L		SW846 8020A
1,2-Dichlorobenzene	ND	1.0	ug/L		SW846 8020A
1,3-Dichlorobenzene	ND	1.0	ug/L		SW846 8020A
1,4-Dichlorobenzene	ND	1.0	ug/L		SW846 8020A
Xylenes (total)	ND	1.0	ug/L		SW846 8020A

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
4-Bromofluorobenzene	104	(70 - 130)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT**GC Semivolatiles**

Client Lot #...: B7K250141
MB Lot-Sample #: B7K260000-223

Work Order #...: CE96H101

Matrix.....: SOLID

Analysis Date...: 12/01/97

Prep Date.....: 11/26/97

Final Wgt/Vol...: 2 mL

Dilution Factor: 1

Prep Batch #...: 7330223

Initial Wgt/Vol: 30 g

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
TPH (C8-C40)	ND	10	mg/kg	FL-DEP FL-PRO

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
o-Terphenyl	85	(22 - 166)
Nonatriacontane	41	(10 - 192)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.



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METHOD BLANK REPORT

GC Semivolatiles

Client Lot #...: B7K250141
MB Lot-Sample #: B7K260000-178

Work Order #...: CE8XA101

Matrix.....: WATER

Analysis Date...: 12/01/97

Prep Date.....: 11/26/97

Final Wgt/Vol...: 2 mL

Dilution Factor: 1

Prep Batch #...: 7330178

Initial Wgt/Vol: 1000 mL

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
TPH (C8-C40)	ND	0.50	mg/L	FL-DEP FL-PRO
SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS		
o-Terphenyl	99	(33 - 162)		
Nonatriacontane	39	(10 - 109)		

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

HPLC

Client Lot #...: B7K250141
MB Lot-Sample #: B7L020000-192

Work Order #....: CEAR5101

Matrix.....: SOLID

Analysis Date...: 12/05/97
Dilution Factor: 1

Prep Date.....: 12/02/97
Prep Batch #....: 7336192
Initial Wgt/Vol: 30 g

Final Wgt/Vol...: 1 mL

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	METHOD
Acenaphthene	ND	50	ug/kg	SW846 8310
Acenaphthylene	ND	50	ug/kg	SW846 8310
Anthracene	ND	50	ug/kg	SW846 8310
Benzo (a) anthracene	ND	5.0	ug/kg	SW846 8310
Benzo (a) pyrene	ND	5.0	ug/kg	SW846 8310
Benzo (b) fluoranthene	ND	5.0	ug/kg	SW846 8310
Benzo (ghi) perylene	ND	5.0	ug/kg	SW846 8310
Benzo (k) fluoranthene	ND	5.0	ug/kg	SW846 8310
Chrysene	ND	5.0	ug/kg	SW846 8310
Dibenz (a, h) anthracene	ND	5.0	ug/kg	SW846 8310
Fluoranthene	ND	5.0	ug/kg	SW846 8310
Fluorene	ND	50	ug/kg	SW846 8310
Indeno (1, 2, 3-cd) pyrene	ND	5.0	ug/kg	SW846 8310
Methylnaphthalene	ND	50	ug/kg	SW846 8310
-Methylnaphthalene	ND	50	ug/kg	SW846 8310
Naphthalene	ND	50	ug/kg	SW846 8310
Phenanthrene	ND	50	ug/kg	SW846 8310
Pyrene	ND	5.0	ug/kg	SW846 8310

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Carbazole	80	(30 - 130)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.



Environmental
Services

METHOD BLANK REPORT

HPLC

Client Lot #...: B7K250141
MB Lot-Sample #: B7K260000-158

Work Order #...: CE8W5101

Matrix.....: WATER

Analysis Date...: 12/01/97

Prep Date.....: 11/26/97

Final Wgt/Vol...: 1 mL

Dilution Factor: 1

Prep Batch #...: 7330158

Initial Wgt/Vol: 1000 mL

PARAMETER	RESULT	REPORTING		METHOD
		LIMIT	UNITS	
Acenaphthene	ND	1.0	ug/L	SW846 8310
Acenaphthylene	ND	1.0	ug/L	SW846 8310
Anthracene	ND	1.0	ug/L	SW846 8310
Benzo(a)anthracene	ND	0.092	ug/L	SW846 8310
Benzo(a)pyrene	ND	0.10	ug/L	SW846 8310
Benzo(b)fluoranthene	ND	0.092	ug/L	SW846 8310
Benzo(ghi)perylene	ND	0.20	ug/L	SW846 8310
Benzo(k)fluoranthene	ND	0.15	ug/L	SW846 8310
Chrysene	ND	0.10	ug/L	SW846 8310
Dibenz(a,h)anthracene	ND	0.20	ug/L	SW846 8310
Fluoranthene	ND	0.20	ug/L	SW846 8310
Fluorene	ND	2.0	ug/L	SW846 8310
Indeno(1,2,3-cd)pyrene	ND	0.092	ug/L	SW846 8310
1-Methylnaphthalene	ND	1.0	ug/L	SW846 8310
2-Methylnaphthalene	ND	1.0	ug/L	SW846 8310
Naphthalene	ND	1.0	ug/L	SW846 8310
Phenanthrene	ND	1.0	ug/L	SW846 8310
Pyrene	ND	0.20	ug/L	SW846 8310

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Carbazole	66	(30 - 130)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #....: B7K250141 Work Order #....: CEA4R102-LCS Matrix.....: SOLID
 LCS Lot-Sample#: B7L010000-125 CEA4R103-LCSD
 Prep Date.....: 11/30/97 Analysis Date...: 11/30/97
 Prep Batch #....: 7335125
 Dilution Factor: 1 Final Wgt/Vol...: 5 mL
 Initial Wgt/Vol: 100 uL

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>
Benzene	94	(61 - 141)			SW846 8020A
	106	(61 - 141)	12	(0-20)	SW846 8020A
Toluene	90	(61 - 136)			SW846 8020A
	102	(61 - 136)	12	(0-20)	SW846 8020A

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
4-Bromofluorobenzene	99	(70 - 130)
	103	(70 - 130)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

*old print denotes control parameters



Environmental
Services

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #....: B7K250141 Work Order #....: CEC1L102 Matrix.....: SOLID
LCS Lot-Sample#: B7L020000-257
Prep Date.....: 12/02/97 Analysis Date...: 12/02/97
Prep Batch #....: 7336257
Dilution Factor: 1 Final Wgt/Vol...: 5 mL
Initial Wgt/Vol: 2.5 g

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>
Benzene	118	(61 - 141)	SW846 8020A
Toluene	109	(61 - 136)	SW846 8020A

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
4-Bromofluorobenzene	82	(70 - 130)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: B7K250141 Work Order #...: CECNN102-LCS Matrix.....: WATER
 LCS Lot-Sample#: B7L030000-270 CECNN103-LCSD
 Prep Date.....: 12/01/97 Analysis Date...: 12/01/97
 Prep Batch #...: 7337270
 Dilution Factor: 1 Final Wgt/Vol...: 5 mL
 Initial Wgt/Vol: 5 mL

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>
Benzene	88	(49 - 149)			SW846 8020A
	96	(49 - 149)	9.5	(0-20)	SW846 8020A
Chlorobenzene	94	(55 - 135)			SW846 8020A
	99	(55 - 135)	4.7	(0-20)	SW846 8020A
Toluene	93	(65 - 130)			SW846 8020A
	98	(65 - 130)	5.7	(0-20)	SW846 8020A

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
4-Bromofluorobenzene	104	(70 - 130)
	100	(70 - 130)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters



Environmental
Services

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Semivolatiles

Client Lot #...: B7K250141 Work Order #...: CE96H102 Matrix.....: SOLID
LCS Lot-Sample#: B7K260000-223
Prep Date.....: 11/26/97 Analysis Date...: 12/01/97
Prep Batch #...: 7330223
Dilution Factor: 1 Final Wgt/Vol...: 2 mL
Initial Wgt/Vol: 30 g

<u>PARAMETER</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>	<u>METHOD</u>
TPH (C8-C40)	93	(52 - 112)	FL-DEP FL-PRO

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
o-Terphenyl	90	(22 - 166)
Nonatriacontane	46	(10 - 192)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Semivolatiles

Client Lot #....: B7K250141 Work Order #....: CE8XA102-LCS Matrix.....: WATER
 LCS Lot-Sample#: B7K260000-178 CE8XA103-LCSD
 Prep Date.....: 11/26/97 Analysis Date...: 12/01/97
 Prep Batch #....: 7330178
 Dilution Factor: 1 Final Wgt/Vol...: 2 mL
 Initial Wgt/Vol: 1000 mL

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
TPH (C8-C40)	91	(60 - 115)			FL-DEP FL-PRO
	95	(60 - 115)	4.3	(0-20)	FL-DEP FL-PRO

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
o-Terphenyl	95	(33 - 162)
	97	(33 - 162)
Nonatriacontane	37	(10 - 109)
	59	(10 - 109)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

*old print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

HPLC

Client Lot #...: B7K250141 Work Order #...: CEAR5102 Matrix.....: SOLID
LCS Lot-Sample#: B7L020000-192
Prep Date.....: 12/02/97 Analysis Date...: 12/05/97
Prep Batch #...: 7336192
Dilution Factor: 1 Final Wgt/Vol...: 1 mL
Initial Wgt/Vol: 30 g

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
Acenaphthene	89	(43 - 115)	SW846 8310
Chrysene	85	(48 - 115)	SW846 8310
Fluorene	88	(44 - 115)	SW846 8310
1-Methylnaphthalene	79	(43 - 115)	SW846 8310
Naphthalene	83	(36 - 115)	SW846 8310
Pyrene	77	(48 - 115)	SW846 8310

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Carbazole	95	(30 - 130)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

HPLC

Client Lot #....: B7K250141 Work Order #....: CE8W5102 Matrix.....: WATER
 LCS Lot-Sample#: B7K260000-158
 Prep Date.....: 11/26/97 Analysis Date...: 12/01/97
 Prep Batch #....: 7330158
 Dilution Factor: 1 Final Wgt/Vol...: 1 mL
 Initial Wgt/Vol: 1000 mL

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>
Naphthalene	80	(9.0- 115)	SW846 8310
1-Methylnaphthalene	89	(28 - 115)	SW846 8310
Acenaphthene	92	(31 - 115)	SW846 8310
Fluorene	91	(23 - 115)	SW846 8310
Pyrene	85	(49 - 115)	SW846 8310
Chrysene	74	(55 - 115)	SW846 8310

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Carbazole	83	(30 - 130)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.
 Bold print denotes control parameters

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: B7K250141 Work Order #...: CE8GE105-MS Matrix.....: SOLID
MS Lot-Sample #: B7K250141-004 CE8GE106-MSD
Date Sampled...: 11/19/97 Date Received...: 11/25/97
Prep Date.....: 12/03/97 Analysis Date...: 12/03/97
Prep Batch #...: 7336257
Dilution Factor: 1 Initial Wgt/Vol: 2.5 g Final Wgt/Vol...: 5 mL
% Moisture.....: 13

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Benzene	111	(39 - 150)			SW846 8020A
	117	(39 - 150)	5.6	(0-25)	SW846 8020A
Toluene	103	(46 - 148)			SW846 8020A
	110	(46 - 148)	6.8	(0-25)	SW846 8020A

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
4-Bromofluorobenzene	83	(70 - 130)
	84	(70 - 130)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and reporting limits have been adjusted for dry weight.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC Semivolatiles

Client Lot #...: B7K250141 Work Order #...: CE8FW105-MS Matrix.....: SOLID
 MS Lot-Sample #: B7K250141-001 CE8FW106-MSD
 Date Sampled...: 11/19/97 Date Received...: 11/25/97
 Prep Date.....: 11/26/97 Analysis Date...: 12/01/97
 Prep Batch #...: 7330223
 Dilution Factor: 1 Initial Wgt/Vol: 30 g Final Wgt/Vol...: 2 mL
 % Moisture.....: 14

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
TPH (C8-C40)	NC,MSB	(41 - 224)			FL-DEP FL-PRO
	NC,MSB	(41 - 224)		(0-25)	FL-DEP FL-PRO

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
o-Terphenyl	92	(22 - 166)
	92	(22 - 166)
Nonatriacontane	64	(10 - 192)
	53	(10 - 192)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

NC print denotes control parameters

NC The recovery and RPD were not calculated.

MSB The recovery and RPD were not calculated because the sample amount was greater than four times the spike amount.

MATRIX SPIKE SAMPLE EVALUATION REPORT

HPLC

Client Lot #....: B7K250141 Work Order #....: CE8G5105-MS Matrix.....: SOLID
 MS Lot-Sample #: B7K250141-002 CE8G5106-MSD
 Date Sampled....: 11/19/97 Date Received...: 11/25/97
 Prep Date.....: 12/02/97 Analysis Date...: 12/05/97
 Prep Batch #....: 7336192
 Dilution Factor: 1 Initial Wgt/Vol: 30 g Final Wgt/Vol...: 1 mL
 % Moisture.....: 14

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Acenaphthene	69	(10 - 124)			SW846 8310
	63	(10 - 124)	9.3	(0-30)	SW846 8310
Chrysene	75	(10 - 199)			SW846 8310
	72	(10 - 199)	5.0	(0-30)	SW846 8310
Fluorene	95	(10 - 142)			SW846 8310
	99	(10 - 142)	3.5	(0-30)	SW846 8310
1-Methylnaphthalene	171 a	(30 - 130)			SW846 8310
	502 a,p	(30 - 130)	92	(0-30)	SW846 8310
Naphthalene	112	(10 - 122)			SW846 8310
	187 a,p	(10 - 122)	48	(0-30)	SW846 8310
Pyrene	349 a	(10 - 140)			SW846 8310
	720 a,p	(10 - 140)	69	(0-30)	SW846 8310

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Carbazole	85	(30 - 130)
	72	(30 - 130)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and reporting limits have been adjusted for dry weight.

a Spiked analyte recovery is outside stated control limits.

p Relative percent difference (RPD) is outside stated control limits.

Client: Brown & Root Project Name: NAS Whiting Field
Date Received: 11/25/97 Lot Number: BTR 250141
Received By: Carol McMurty CUR Completed By: Carol McMurty

Cooler/Shipping Information:

Type: Cooler ☒ Box ☐ Other ☐

Cooler ID/Track #					
Temp (Celsius)	4°				
Cooler ID/Track #					
Temp (Celsius)					

Any "NO" responses or discrepancies should be explained in the "Comments" section below.

CHECKLIST

	YES	NO	NA
1. Were custody seals on shipping container(s) intact? Check "NA" if hand delivered. If "Yes," check one: CUSTODY SEAL SAVED <input type="checkbox"/> UNABLE TO SAVE CUSTODY SEAL <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
2. Were custody papers properly included with samples?	<input checked="" type="checkbox"/>		
3. Were custody papers properly filled out (ink, signed, match labels)?	<input checked="" type="checkbox"/>		
4. Did all bottles arrive in good condition (unbroken)?	<input checked="" type="checkbox"/>		
5. Were all bottle labels complete (sample #, date, signed, analysis, preservatives)?	<input checked="" type="checkbox"/>		
6. Were correct bottles used for the tests indicated?	<input checked="" type="checkbox"/>		
Were proper sample preservation techniques indicated?	<input checked="" type="checkbox"/>		
8. Were samples received within holding times? If "No," NCM required.	<input checked="" type="checkbox"/>		
9. Were all VOA bottles checked for the presence of air bubbles? If air bubbles were found, indicate in comment section.	<input type="checkbox"/>		
10. Were samples in direct contact with wet ice? If "No," check one: NO ICE <input type="checkbox"/> BLUE ICE <input type="checkbox"/>	<input checked="" type="checkbox"/>		
11. Were the samples received with a temperature blank? RECORD TEMPERATURE ABOVE If "No," check one: UNABLE TO DETERMINE TEMP <input type="checkbox"/> TEMP TAKEN FROM ICE/WATER NEAR SAMPLES <input type="checkbox"/>	<input checked="" type="checkbox"/>		
12. Were sample pHs checked and recorded by S.R. (see back for Page 2 - Sample pH)? NOTE: TOC and VOA samples are checked by laboratory analysts. If response is "Not Inspected," then a pH check is not required/performed by Sample Receiving and Page 2 is not applicable.	<input checked="" type="checkbox"/>		Not inspected - Page 2 not completed <input type="checkbox"/>
13. Were samples accepted into the laboratory?	<input checked="" type="checkbox"/>		

Comments:

I present for MS/MSD - but they do not say which
ID they are for or time-

Complete if applicable: NCM#: _____ Check one: Notified PM by E-mail ☐ Hard Copy ☐

Project Manager initials/date reviewed: MC 12/2/97

Corrective Action: 8310 MS/MSD performed on SBC5-0506 ; FC-PRD MS/MSD on SBC5-0506
8020A MS/MSD on SBC9

Corrective Action completed by/date: _____

**TETRA TECH NUS, INC.**

1311 Executive Center Drive, Ellis Building. ■ Suite 220 ■ Tallahassee, FL 32031
(850) 656-5458 ■ FAX (850) 656-7403 ■ www.tetratech.com

June 5, 1998

Ms. Nancy Robertson
Quanterra Incorporated
5910 Breckenridge Parkway, Suite H
Tampa, Florida 33610

Subject: **B7K250141**

Dear Ms. Robertson:

Pursuant to our earlier conversation, please make the changes outlined below to the laboratory report for the referenced lot number. A copy of the chain of custody for these samples is attached for your reference.

Original Sample ID	Revised Sample ID
DSP-SS-SB01-0708	PDF-SS-SB01-0708
DSP-SS-SB06-1819	PDF-SS-SB06-1819
DSP-SS-SB06-1011	PDF-SS-SB06-1011
HSE-SS-SB01-0405B	PPS-SS-SB01-0405B
HSE-SS-SB01-0405	PPS-SS-SB01-0405
HSE-SS-SB01-1011	PPS-SS-SB01-1011
HSE-SS-SB02-1011	PPS-SS-SB02-1011

Your assistance in this matter is greatly appreciated. If you have any questions please contact me at (850) 656-5458.

Sincerely,
TETRA TECH NUS, INC.

Paul E. Calligan, P.G.
Task Order Manager

/pc

Enclosures

APPENDIX I

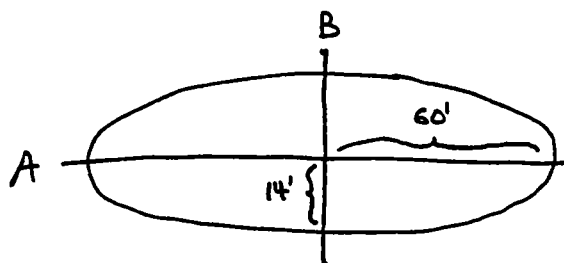
SOIL VOLUME AND CONTAMINANT MASS CALCULATIONS

CALCULATION WORKSHEET

Order No. 19116 (01-91)

PAGE 1 OF 1

CLIENT <u>South Div</u>		JOB NUMBER <u>7648</u>	
SUBJECT <u>soil volume calc. - oil/water separator</u>			
BASED ON <u>soil Plume Maps</u>		DRAWING NUMBER	
BY <u>P. Calligan</u>	CHECKED BY	APPROVED BY	DATE <u>6/1/98</u>



$$\begin{aligned}
 \text{Area} &= \pi (rA)(rB) \\
 &= \pi (60')(14') \\
 &= 2,639 \text{ ft}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Volume} &= \frac{2,639 \text{ ft}^2 \times 16 \text{ ft (avg depth)}}{27 \text{ ft}^3/\text{yd}^3} \\
 &= 1,564 \text{ yd}^3
 \end{aligned}$$

Avg TPH Concentration

<u>SB #</u>	<u>TRPH Concent.</u>
OWS - SB05 - 0506	540 mg/kg
OWS - SB01 - 1112	3800 mg/kg
OWS - SB09 - 0506	<u>5.7 mg/kg</u>

$$\text{Avg Concent} = 1,449 \text{ mg/kg}$$

APPENDIX I

ESTIMATED MASS OF CONTAMINANTS IN VADOSE ZONE SOIL MATRIX

SITE INFORMATION:

Site:	OIL/WATER SEPARATOR
Location:	NAS WHITING FIELD, MILTON, FLORIDA
Client:	SOUTH DIV

ASSUMPTIONS:

INPUT:

Estimated Impacted Area	sq ft	2,639
Estimated Average Impacted Thickness	ft	16
Estimated Impacted Volume	cu ft	42,224
Average Total VOA Concentration	mg/kg	1,449

CALCULATIONS:

Estimated mass of hydrocarbons in soil

$$42,224 \text{ ft}^3 \times \frac{1 \text{ yd}^3}{27 \text{ ft}^3} \times \frac{1.4 \text{ tons}}{1 \text{ yd}^3} \times 1016 \frac{\text{kg}}{\text{ton}} \times 1,449 \frac{\text{mg}}{\text{kg}} \text{ TRPH} \times (1.0 \times 10^{-6}) \frac{\text{kg}}{\text{mg}} \times 2.204623 \frac{\text{lb}}{\text{kg}}$$

lbs 7106

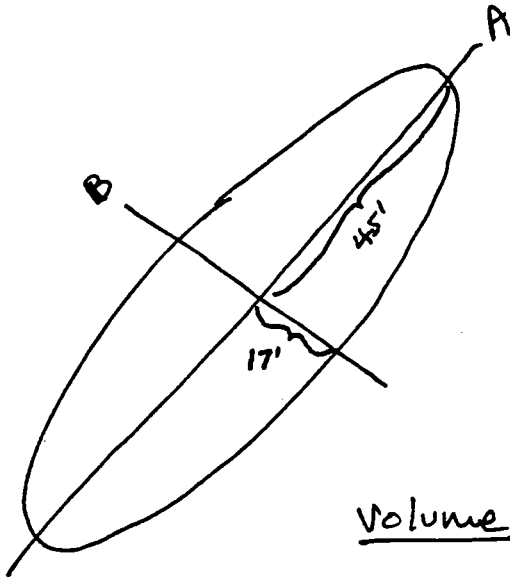
PREPARED BY: _____ CHECKED BY: _____ Date _____

CALCULATION WORKSHEET

Order No. 19116 (01-91)

PAGE 1 OF 1

CLIENT	South Div		JOB NUMBER	7648
SUBJECT	soil volume & Avg TPH concentration Calc. - Dispensing Facility			
BASD ON	soil Plume Maps		DRAWING NUMBER	
BY	P. Calligan	CHECKED BY	APPROVED BY	DATE 6/1/98



$$\begin{aligned}
 \text{Area} &= \pi (rA)(rB) \\
 &= \pi (45')(17') \\
 &= 2,403 \text{ ft}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Volume} &= \frac{2,403 \text{ ft}^2 \times 16 \text{ ft (avg depth)}}{27 \text{ ft}^3/\text{yd}^3} \\
 &= 1,424 \text{ yd}^3
 \end{aligned}$$

Average TPH Concentration

SB #

TPH concentration

PDF - SB01 - 0708

ND

PDF - SB06 - 1011

20 mg/kg

PDF - SB06 - 1819

ND

Average TPH concent. = 20 mg/kg.

APPENDIX I

ESTIMATED MASS OF CONTAMINANTS IN VADOSE ZONE SOIL MATRIX

SITE INFORMATION:

Site:	PRODUCT LINE DISPENSING FACILITY
Location:	NAS WHITING FIELD, MILTON, FLORIDA
Client:	SOUTH DIV

ASSUMPTIONS:

INPUT:

Estimated Impacted Area	sq ft	2,403
Estimated Average Impacted Thickness	ft	16
Estimated Impacted Volume	cu ft	38,448
Average Total VOA Concentration	mg/kg	20

CALCULATIONS:

Estimated mass of hydrocarbons in soil

$$38,448 \text{ ft}^3 \times \frac{1 \text{ yd}^3}{27 \text{ ft}^3} \times \frac{1.4 \text{ tons}}{1 \text{ yd}^3} \times 1016 \frac{\text{kg}}{\text{ton}} \times 20 \frac{\text{mg}}{\text{kg}} \text{ TRPH} \times (1.0 \times 10^{-6}) \frac{\text{kg}}{\text{mg}} \times 2.204623 \frac{\text{lb}}{\text{kg}}$$

lbs 9

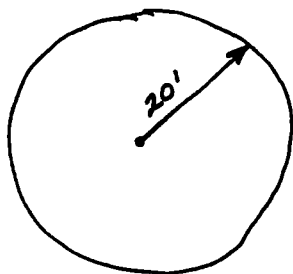
PREPARED BY: _____ CHECKED BY: _____ Date _____

CALCULATION WORKSHEET

Order No. 19118 (01-91)

PAGE 1 OF 1

CLIENT South Div		JOB NUMBER 7648	
SUBJECT soil volume & Avg TPH concent. calcs. - Pump station			
BASED ON Soil Plume Maps		DRAWING NUMBER	
BY P. Calliga	CHECKED BY	APPROVED BY	DATE 6/1/98



$$\begin{aligned}
 \text{Area} &= \pi r^2 \\
 &= \pi (20)^2 \\
 &= 1,257 \text{ ft}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Volume} &= \frac{1,257 \text{ ft}^2 \times 13 \text{ ft}}{27 \text{ ft}^3/\text{yd}^3} \\
 &= 605 \text{ yd}^3
 \end{aligned}$$

Average TPH Concentration

SB #

PPS-SB01-0405

PPS-SB01-1011

PPS-SB02-1011

TPH concentration

14 mg/kg

2300 mg/kg

6.5 mg/kg

$$\text{Average TPH conc.} = 774 \text{ mg/kg.}$$

APPENDIX I

ESTIMATED MASS OF CONTAMINANTS IN VADOSE ZONE SOIL MATRIX

SITE INFORMATION:

Site:	PRODUCT LINE PUMP STATION
Location:	NAS WHITING FIELD, MILTON, FLORIDA
Client:	SOUTH DIV

ASSUMPTIONS:

INPUT:

Estimated Impacted Area	sq ft	1,257
Estimated Average Impacted Thickness	ft	13
Estimated Impacted Volume	cu ft	16,341
Average Total VOA Concentration	mg/kg	774

CALCULATIONS:

Estimated mass of hydrocarbons in soil

$$16,341 \text{ ft}^3 \times \frac{1 \text{ yd}^3}{27 \text{ ft}^3} \times \frac{1.4 \text{ tons}}{1 \text{ yd}^3} \times 1016 \frac{\text{kg}}{\text{ton}} \times 774 \frac{\text{mg}}{\text{kg}} \text{ TRPH} \times (1.0 \times 10^{-6}) \frac{\text{kg}}{\text{mg}} \times 2.204623 \frac{\text{lb}}{\text{kg}}$$

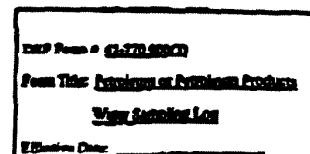
lbs 147

PREPARED BY: _____ CHECKED BY: _____

Date _____

APPENDIX J

FIELD MEASUREMENTS AND SAMPLING FORMS



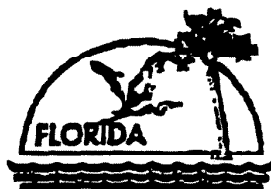
FDEP FACILITY NO.:	WELL NO.: MW01	SAMPLE ID: WHF-GW-MW01	DATE: 2/10/98
SITE NAME: (NAS) Whiffing Field		SITE LOCATION: Pipeline Junction	

WELL DIAMETER (in): 2"		TOTAL WELL DEPTH (ft): 106		DEPTH TO WATER (ft): 84.41		WELL CAPACITY (gal/ft): 0.16		
1 WELL VOLUME (gal) = (TOTAL WELL DEPTH - DEPTH TO WATER) x WELL CAPACITY = - (106 - 84.41) x 0.16 = 3.45								
PURGE METHOD: Submersible pump					PURGING INITIATED AT: 1208		PURGING ENDED AT: 1219	
WELL VOLS. PURGED	CUMUL. VOLUME PURGED (gal)	pH	TEMP. (°C)	COND. (umhos)	PURGE RATE (gpm): 0.60		TOTAL VOLUME PURGED (gal): 18.35	
					COLOR	ODOR	APPEARANCE	OTHER
1	3.45	6.33	23.3	0.151	Light Brown	Slight Fuel like odor		
2	6.9	6.28	22.4	0.124	" "	" "		
3	10.35	6.12	22.4	0.111	" "	" "		
4	13.80	6.03	22.2	0.106	" "	" "		
5	17.25	5.97	22.2	0.099	" "	" "		

SAMPLED BY / AFFILIATION			JASON McLENN / Brown + Root Env.			SAMPLER(S) SIGNATURE(S)		Jason J. McLenn			
SAMPLING METHOD(S):			Batter			SAMPLING INITIATED AT:		1300			
SAMPLING ENDED AT:			1330								
FIELD DECONTAMINATION:			(Y) N			FIELD-FILTERED:			Y N		
DUPLICATE:			Y N								
SAMPLE CONTAINER SPECIFICATIONS			SAMPLE PRESERVATION						INTENDED ANALYSIS AND/OR METHOD		
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	FINAL pH						
1	CG	40ml	HCl	40 ml	5.97	601/602					
2	CG	40ml	NONE	40ml	" "	E08					
3	AG	Liter	HCl	Liter	" "	FL-110					
4	AG	Liter	NONE	Liter	" "	610					
5	HOP	250ml	HNO3	250 ml	" "	Lead					

MATERIAL CODES: AG - AMBER GLASS; CG - CLEAR GLASS; NDP - HIGH DENSITY POLYETHYLENE; O - OTHER (SPECIFY)

NOTE: this does not constitute all the information required by Chapter 62-160, F.A.C.



FDEP Form # 62-70 (2002)
 Form Title: Petroleum or Petroleum Products
 Water Sampling Log
 Revision Date: _____

Petroleum or Petroleum Products Water Sampling Log

FDEP FACILITY NO.:	WELL NO.: MW02	SAMPLE ID: WHF-GW-MW02	DATE: 2/10/98
SITE NAME: (NAS) Whiting Field		SITE LOCATION: Pipeline Junction	

PURGE DATA							
WELL DIAMETER (in): 2"		TOTAL WELL DEPTH (ft): 100		DEPTH TO WATER (ft): 84.31		WELL CAPACITY (gal/ft): 0.16	
1 WELL VOLUME (gal) = (TOTAL WELL DEPTH - DEPTH TO WATER) x WELL CAPACITY = <div style="text-align: center;"> $100 - 84.31 \times 0.16 = 2.51$ </div>							
PURGE METHOD:				PURGING INITIATED AT: 1000		PURGING ENDED AT: 1009	
				PURGE RATE (gpm): 0.08		TOTAL VOLUME PURGED (gal): 13.34	
WELL VOLS PURGED	CUMUL VOLUME PURGED (gal)	pH	TEMP. (°C)	COND. (umhos)	COLOR	ODOR	APPEARANCE
1	2.51	7.98	20.9	0.532	Light Brown	Slight Fuel like odor	
2	5.02	9.03	21.4	0.381	"	"	
3	7.53	8.92	21.5	0.354	"	"	
4	10.04	7.70	21.2	0.291	"	"	
5	12.55	7.18	21.8	0.275	"	"	

SAMPLING DATA						
SAMPLED BY / AFFILIATION: JASON McCann / Brown & Root Env.				SAMPLER(S) SIGNATURE(S): Jason G. McCann		
SAMPLING METHOD(S): Bailor				SAMPLING INITIATED AT: 0930		SAMPLING ENDED AT: 0950
FIELD DECONTAMINATION: <input checked="" type="radio"/> N			FIELD-FILTERED: Y N		DUPLICATE: <input checked="" type="radio"/> N	
SAMPLE CONTAINER SPECIFICATIONS			SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	FINAL pH	
1	CG	40ml	HCl	40ml	7.18	601/602
2	CG	40ml	None	40ml	" "	EOB
3	AG	Liter	HCl	Liter	" "	PL-PRO
4	AG	Liter	None	Liter	" "	GID
5	HDP	250ml	HNO3	250ml	" "	Lead

REMARKS:

MATERIAL CODES: AG = AMBER GLASS; CG = CLEAR GLASS; HDP = HIGH DENSITY POLYETHYLENE; O = OTHER (SPECIFY)

WELL CAPACITY: 1.25" = 0.06 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.47 gal/ft; 8" = 2.61 gal/ft; 12" = 5.88 gal/ft

NOTE: this does not constitute all the information required by Chapter 62-160, F.A.C.

MONITORING WELL DEVELOPMENT RECORD

Well: MW-01

Depth to Bottom (ft): 106

Site Geologist: Jason McCann

Site: NAS Whiting Field/Pipeline Junction Static Water Level Before(ft): 84.50

Drilling Co.: Gulf Atlantic Drilling

Date Installed: 2/5/98 Static Water Level After (ft): 84.39

Project: NAS whitening Field CTO 0037

Date Developed: 2/9/98 Screen Length (ft): 15

Project Number: 7648

Dev. Method: AN LIFT Specific Capacity: 0.16 gal./ft.

Sheet No. 1 of 1

Pump Type: T.MCO Isomeq4 Casing ID (in): 2

Casing ID (in): 2

Pump Type: T.MCO Isovega
SYSTEM

Casing ID (in): 2

[illegible]

MONITORING WELL DEVELOPMENT RECORD

Well: MW-02

Depth to Bottom (ft): 100

Site Geologist: Jason McCann

Site: NAS Whiting Field/Pipeline Junction Static Water Level Before (ft): 84.35

Drilling Co.: Gulf Atlantic Drilling

Date Installed: 2/7/98 Static Water Level After (ft): 84.30

Project: NAS Whiting Field CTO 0037

Date Developed: 2/8/98 Screen Length (ft): 15

Project Number: 7648

Dev. Method: Air Lift Specific Capacity: 0.16 gal./ft.

Sheet No. 1 of 1

Pump Type: Timco Isomega Casing ID (in): 2

System

Time	Estimated Sediment Thickness (ft)	Cumulative Water Volume or Pumping Rate (gallons/gpm)	Water Level Reading (ft. below TOC)	Temperature (units °C)	pH	Specific Conductance (microsiemens/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1152		2.66	84.35	19.0	7.12	0.593	-10	Brown/slight organic odor
1210		5.32		19.7	7.04	0.569	90	" "
1435		7.98		20.5	5.81	0.450	999	Light Brown/slight organic
1500		10.64		21.1	8.56	0.389	-10	" "
1525		13.30		17.4	8.82	0.381	999	" "
1547		15.96		16.3	9.12	0.381	999	" "
1605		18.62		16.2	9.03	0.331	999	" "
1623		21.28		15.0	8.95	0.356	753	" "
1640		23.95	84.30	18.4	8.79	0.349	230	" "



Brown & Root Environmental

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME / MODEL: Porta FID II
 Serial # 8215
 MANUFACTURER: Heath

445
 JOB NAME: Mobile Filt

JOB NUMBER: 7648

McName

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
11/6/97		Annual Calibration	Re-Formal	by Manufacturer			
11/22/97	100 ppm	100 ppm	-	NO	100 ppm	David Smith	
11/22/97	"	"	-	"	"	David Smith	changed filter
11/23/97	100 ppm	100 ppm	-	NO	100 ppm	David Smith	changed filter
11/24/97	"	"	-	NO	100 ppm	David Smith	changed filter
11/25/97	100 ppm	100 ppm	-	NO	100 ppm	David Smith	
2/3/98	0	100 ppm	-	NO	100 ppm	David Smith	
2/4/98	0	100 ppm	-	NO	100 ppm	David Smith	
2/5/98	0	100 ppm	-	NO	100 ppm	David Smith	
2/5/98	0	100 ppm	-	NO	100 ppm	David Smith	
2/6/98	0	100 ppm	-	NO	100 ppm	David Smith	
2/6/98	0	100 ppm	-	NO	100 ppm	David Smith	
2/7/98	0	100 ppm	-	NO	100 ppm	David Smith	
2/8/98	0	100 ppm	-	NO	100 ppm	David Smith	

ATTACHMENT D

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 FIELD DOCUMENTATION

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Brown & Root Environmental

EQUIPMENT CALIBRATION LOG

Organic Vapor Analyzer

INSTRUMENT NAME / MODEL: P-12 FID II
Serial # 7634

MANUFACTURER: Heath

JOB NAME: NAS
Whiting Field

JOB NUMBER: 7648

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
10/30/97	50 ppm Methane	100 ppm Methane	Calibration Adjustment R28	Yes	100 ppm Methane	Shall Good	Replaced sample inlet filter
11/18/97	100 ppm Methane	100 ppm Methane	N/A	No	100 ppm Methane	Shall Good	
11/18/97 11:45	"	"	"	"	"	G.G.M.	
11/19/97	"	"	"	"	"	Shall Good	
11/20/97	"	"	"	"	"	G.G.M.	replaced sample filter
11/20/97 10:15	200 ppm Methane	"	"	Yes	"	G.G.M.	
11/21/97	100 ppm Methane	"	"	No	"	G.G.M.	
11/21/97	100 ppm	100 ppm Methane	—	No	100 ppm Methane	Shall Good	—
11/21/97	75 ppm	100 ppm Methane	—	Yes	100 ppm Methane	Shall Good	—
11/22/97	50 ppm	100 ppm	—	Yes	100 ppm Methane	Shall Good	
11/22/97	100 ppm	100 ppm	—	No	100 ppm Methane	Shall Good	
2/3/98	0 ppm	100 ppm	—	No	100 ppm Methane	Shall Good	
2/4/98	0 ppm	100 ppm	—	No	100 ppm	Shall Good	
2/6/99	0 ppm	100 ppm	—	No	100 ppm	Shall Good	
2/8/98	0 ppm	100 ppm	—	No	100 ppm	Shall Good	

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EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME / MODEL : Electronic water level Indicator

JOB NAME: was whoring kind

MANUFACTURER: Keck

JOB NUMBER: 7648

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EQUIPMENT CALIBRATION LOG

MANUFACTURER: Cole Palmer

JOB NUMBER: 7648

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